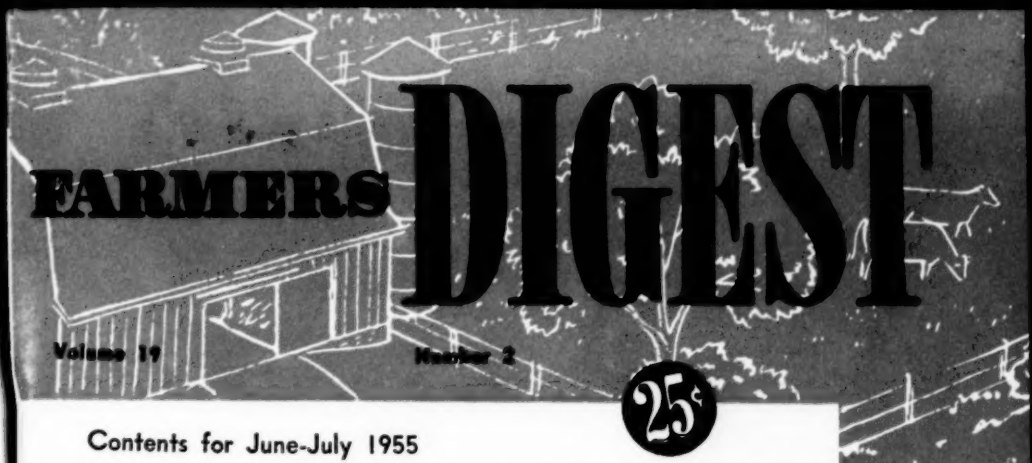

FARMERS DIGEST

Volume 19 Number 2

25¢

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The Farmer's Digest

Fort Atkinson, Wisconsin

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Published monthly, except June-July and August-September, when published bi-monthly at Fort Atkinson, Wisconsin, by Farmer's Digest Co.

1 Yr., $2.50, 2 Yrs., $4.50, 3 Yrs., $6.50 Canadian and Foreign Subscriptions, $3 for 1 Year, $5.50 for 2 Years

POSTMASTER: Return all undeliverable copies to Farmer's Digest, Fort Atkinson, Wis. Entered as second-class matter at the Post Office at Ambler, Pa., July 30, 1948, re-entered at Fort Atkinson, Wis., under the act of March 3, 1879.

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The **Farmers Digest**

Volume 19 June - July 1955 Number 2

The Menace of the SHOW RING

At the heart of British farming, has always been the great livestock exhibitions. This author, writing in an English magazine, questions that standards used to judge livestock are suited to modern needs. In this country, his point of view may have keen protagonists . . .

Condensed from British Agricultural Bulletin

J P. Maule

WHILE I was standing in the stock lines at the great London Fat Stock Show with a man whose name is respected throughout the British livestock breeding world, a class of steers on their way from the judging ring passed us.

As they waddled their ponderous way along, he turned to me and remarked: "A good picture, but too much of that goes into the offal dumps". Two years ago a butcher who had attended the Scottish National Fat Stock Club's show at Edinburgh was much more outspoken. "Those people who fatten stock to that extent", he said in a strong letter to the Press, "should be prosecuted for misuse of feedingstuffs."

The National Shows

I have stood under the summer sun at one of our national shows with an other respected judge and breeder who opined that "these shows" have done more damage to some of our breeds (he mentioned Clydesdales and a beef cattle breed particularly) than any other single institution.

To those who have sat in the grandstand at the Royal English

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or at the Royal Highland, or at the great Commonwealth shows like the Sydney Royal or the Toronto Royal Fair, and watched with admiring eyes the grand parades, such views must seem nothing but expressions of a heresy so extreme that it need cause not a ripple of worry, for it is so far beneath contempt that no serious person would ever hold with it or repeat it.

But those people I quoted are real persons, persons of some authority, and there they were within the hallowed walls of great national exhibitions and saying it out loud. Just how wrong were they, if wrong they were? The remarks I have quoted were all they said, for our real stocksmen are men of few words, so it will be left to my inadequate pen to develop the arguments for them.

Personally I think they have hit upon a truth that has not yet dawned on a sufficient number of people, but when it does, our great annual shows will forego changes which will make their future shape unrecognizable when compared with that of their past, except in superficial appearance, for I think animals will continue actually to appear there.

One of the deepest troubles about our English shows is that they have been with us so long—well over a century for many, and in some cases, including local shows, a century and a half or more—that we forget what has happened in the science of animal breeding in the interval since their beginning.

In most cases the stock sections have been islands round which swirled tides of machinery and equipment which pushed the animals into a background that is still, in a great many minds, bitterly resented.

Changes in Breeding Policy

The trouble is that the transformation in the course of a century from the pruning hook to the combine harvester; from marling to Krilium and from hard work and hope to selective weed-killers, when set against the appearance of a bull or a cow makes it look as if everything has changed but the animals, which strangely enough are still, basically, the reason for the holding of these shows at all.

And I must emphasize this last point. No matter how many victories we may claim along the road of mechanistic and scientific progress, no matter how many great "special events" are laid on the main rings at the summer shows and no matter how much the colour and the glitter of the makers' stands attract at the Smithfield to show us progress in steel and plastic form, no matter how these other things change and multiply and make us stand in wonder — the basic attraction

of these great events of summer and winter is that they are still the best and the only real meeting place for the stocksmen of the country.

It is necessary to let that stand firm as a fact, and acknowledge it, before proceeding to say . . . "yes, but . . . " for it does seem necessary to say "yes, but."

If, as my friend says, we see at a fat stock show too many animals with waste fat which must "go into the barrow" and not on to the kitchen table, does that mean that there is something wrong? The immediate "official" answer to this is that when achieving the peak we may go past the normal and that it is in the very act of overdoing it that we can show the ordinary farmer just what can be done.

In other words, in order to impress, we must exaggerate.

But I think that it is time we changed this outlook, if indeed that is the general excuse for the overfat beasts we see at the fat stock shows.

Pigs are probably the best example of how fallacious the "impress-by-exaggeration" theory actually is. We still judge pigs on their feet when they are destined for bacon, but every now and again there is an outcry against the futility of looking at ornaments when we should be measuring sides of bacon to nths of an inch of tolerance.

Denmark

Which brings me, of course, to the Danes. They are the best example of my contention that genetics and recording have destroyed the need for our live stock shows in their present form, especially in dairy cattle and pigs.

In to the jungle of what is known as livestock breeding theories in the world today, the Danes have marched with machettes swinging, clearing a path of common sense. I have been to the great national dairy show in Copenhagen, but have searched in vain for a cow. No, there are no cows, but there are judges there, paying very close attention to the product of the cow and I need not enlarge on how the Danes have brought that to a pitch of perfection in form and economy in production.

Because I started with our fat stock shows, it does not mean that the dairy cows, with their attention to production and quality of milk are above reproach in their present form.

Dairy Shows

The dairy shows are just as worthy of criticism as the fat stock shows and indeed they have been at the receiving end of a good deal of outspoken attack in the past few years.

Those who prate about conformation and type tend to forget that the job of a dairy cow is to provide milk. The man who

has put this point most forcibly, of course, is Professor Robert Boutflour, who said that if camels gave more milk than Friesians he would breed camels and never mind the humps. I remember him being questioned by a conformation-and-type enthusiast in Edinburgh before 500 dairy farmers. The heckler was drooling about "a nice straight back" when Professor cut in. "Is this a dairy cow or are you going to ride her to hounds?"

But conformation cannot be dismissed too completely. And here is where our shows performed their great service in the early days of their honorable history. They did help to give us uniform types which, before modern advances, helped in turn to give us the product we wanted. But there are other ways now of judging the product and measuring the animal's efficiency of output, especially in dairy stock and pigs.

In his Smithfield show lecture, Dr. Allan Fraser pointed out the need for some standard of measuring quality in beef cattle and the great difficulty of achieving this because of the near-infinity of the variables. But this is a target worthy of aim and we should try to get near that target.

The Show Ring

Shows are indeed no longer the yardstick. There are men today who remember how the Clydesdale breed suffered by breeding for show points. Today the Ayrshire men are fighting a losing battle on the show points of horns —and how many man hours have been lost in training and polishing those useless and dangerous appendages?

In spite of all that I have said I do not propose to leave the measuring entirely to the recorder and the geneticist.

Could you imagine a stock show, summer or winter, without its parade of lovely stock? I cannot, so while I am in favor of a complete change in the measurement I do not propose the abolition of the ring, the parade and the judge who just looks at the stock.

The fear is that our shows tend to emphasize the fancy points so that even respected breeders may tend to get a little off aim.

No, I do not propose the abolition of the parade in the ring. Would it not be possible, and there is no harm in ending with a question, to follow the commonsense Danes, already fifty years ahead of us in pig progeny testing and production? They still have stock shows with parades of stock, but before the animal goes into the ring, there goes with it a production record and a genetical record of what its relatives have done, which leaves the points for the way it looks to take up only a small percentage of the total. This system has two

advantages. Even at the smaller shows in Denmark there are unbelievably huge classes, and there is none of this espionage to find out "is so-and-so showing? If not, I needn't bother."

This attitude in this country makes a stock catalogue a top secret document until the opening day of the show.

The other advantage of the Danish system is this, that in a class where there are several animals reaching the required standard, then there may be seveeral first prizes, while if the reverse is true, there may be no firsts and even no seconds, a thing that seldom happens here where the best of any class, no matter how scruffy, will always get the red ticket.

We have a long way to go, but the man who said "too much goes in the barrow", the butcher who wanted a presecution and the breeder who saw damage to a breed in the show ring, were making little sounds which may become stronger sooner than we think, and the sooner these sounds are the expressions of opinion of the majority, the sooner will our great livestock shows come back to their great and original task, of making our fine livestock even better.

The very morning I put this article in the post to Mr. Editor, I found a straw in the wind—a report that a well-known authority has called for progeny testing for beef bulls. We are on the way!

Fastest Gaining Lambs More Efficient

Lambs that gain fastest appear also to gain more weight per pound of feed. The report is based on feeding tests by the Wyoming Agricultural Experiment Station.

M. P. Botkin, animal husbandman, emphasizes that test results look good but are not final because the trials have run only one year. The experiment included 96 lambs individually fed. Rations fed varied in the ratio of roughage to concentrate. The type of roughage did not seem to change the relationship between rate of gain and efficiency.

Research workers noticed that individually fed lambs did not gain as fast or efficiently as group-fed lambs. They think the difference may have been caused by lack of exercise or by difference in watering. Water was heated for group-fed lambs but not for those fed individually.

University of Wyoming

HOW to BUILD a BUNKER SILO

More about bunker silos from our neighbor to the north . . .

Condensed from Farmer's Magazine (Canada)

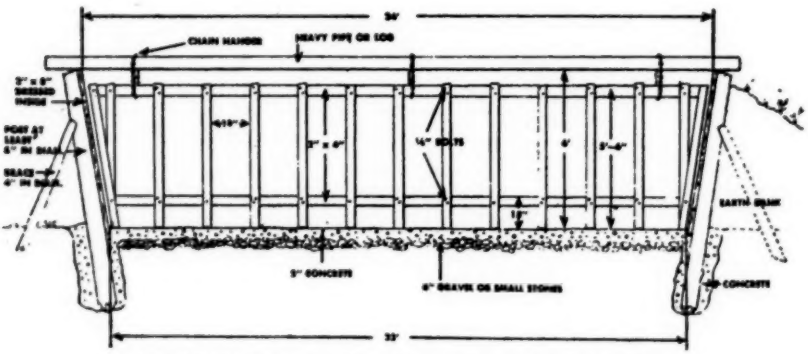
A. E. Ramsey

Here are common-sense plans for a money saving silo. You can adapt them to your own ideas and materials.

MORE and more farmers are finding they have to reduce the cost of producing a gallon of milk or a pound of beef in order to make a profit. Since this, naturally, can't be done by lowering quality, the matter boils downs to how to produce milk or beef more efficiently.

One way to do this is to self-feed as much as possible. In fact, economists have estimated that self-feeding, all other things being equal, is perhaps the most important single step towards increased efficiency, since it will cut down that biggest money-eater of them all: labor.

So, it's not surprising that the surface, or bunker, silo is coming in very fast. No other common type of silo lends itself so well to self-feeding. The bunker silo is comparatively cheap to build and maintain and gives fewer problems from the machinery and fill-



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ing angle than other silos. Most important, though, is the fact that almost all farmers and agricultural research men agree that silage out of a bunker is as good as silage from any other type of silo. The matter of silage wasted through spoilage is less clear-cut since it depends very much on how well the silage is put up and the general silage-making practices. But most farmers who have a bunker silo will tell you they have less spoilage with it than other types they've tried.

The trench silo had many disadvantages. Drainage was difficult and even if you managed to get a tile line with "fall" on it out of the silo it usually filled up in a year with a white, scummy substance that came out of the silage. Mechanization of the operation with a trench silo was difficult, too. Both these problems have been solved to a large extent with the surface silo.

Maybe it's impossible to say just what the ideal bunker silo should look like. In any case everyone must make changes here and there to fit the silo to his needs. But on the basis of what we've found from several farmers who use these silos successfully and from the Agricultural Engineering Departments at the Ontario Agricultural College and the Central Experimental Farm, here's a silo that would be pretty close to ideal:

Size: Decide how much silage you're going to need on the basis of how many cattle you intend to feed and how much silage per head per day they will get. Figure on the basis of 35 pounds for every cubic foot of silage and a 210-day feeding period which is a pretty close average. If you feed dairy cattle, make the openings in the feeding grate about 18 in. wide. For beef cattle, depending on their size, from six to 12 inches or so. Most bunker silos have walls about six feet high and the silage in them about a foot lower at the highest point. Cattle can't self-feed much higher. In general, a silo shouldn't be wider than 35 or 40 feet or narrower than 16 or 18 feet. If it's too narrow, you'll have trouble driving the machinery through and maneuvering in the silo. If it's too wide, it'll be awkward to handle.

Bottoms: Always of concrete if cattle are self-fed out of the silo. If you're not self-feeding, packed earth will do but in this case a bunker silo may not be the best type of silo for your operation. The concrete surface on the bottom should be rough so cattle will have a good foothold even in wet weather. A slope in the bottom to help drain the silo is advisable but may not always be necessary. If you have a slope, start feeding from the lower end. With a slope, it is sometimes difficult to have it steep enough to do a good job

of draining and still not too steep for the cows to stand on comfortably.

Wall: Wood planks, at least two inches thick, should be used. The best thing is to use matched lumber horizontally but some farmers have good results with unmatched, rough lumber placed vertically, or with ¾-inch plywood. In any case, the wood should be treated. The posts may be either of wood or metal. If wood posts are used, they should be at least six inches in diameter at the top and placed not less than three feet into the ground. They may be sunk in concrete. At least every other post should be braced with a knee brace. The walls should be as tight as possible and it's good to use a carpenter's clamp to pull the boards together when the silo is built. You should have the walls slope outwards in order to get near them with a tractor packing the silage in the silo. A slope of about two feet difference between the width of the silo at the bottom and the top is plenty.

Insulation: In most areas of Canada it's necessary to bank the outsides of the walls with soil and some like to top it off with bales of straw or hay. Sometimes it's necessary to cover the face of the silo with sacking to keep the frost out. Covering on top of the silo is a matter of economics: if you feel it's worth it to you to keep spoilage down to a minumum, you should cover the silo. The best way is to spread an even layer of sawdust on top of the well-packed silo after it's filled. Then, late in the season, put on a layer of straw. If you put on the straw in the summer, it'll get soggy from rain and weather and won't do much good. So it's better to keep it fluffy and loose by putting it on later.

Self-feeder: The self-feeder in the silo should have vertically placed boards dividing the face into the widths that fit your feeding needs. If you feed both beef and dairy cattle, it may be well to build the feeding gate so you can change the spacing of the dividing boards. Hang the feeding gate from a strong wood post or piece of metal pipe in a way that makes it easy to move ahead as the cattle eat off the face.

There are many experiments going on to find ways to improve bunker silos. It has been found that many different materials can be used successfully for sides. Covering the silo with a plastic material that is currently becoming available has cut spoilage to practically nothing. But the cost of this plastic is still too high to make it practical on the farm. Tests are also carried out to find out which kind of drainage slope in the bottom of the silo is best. So far, no single kind of slope has

proved best.

Tom Dickison, manager of Borden's Ottawa Dairy Farm, has had a lot of experience with silos. He's also a man who "can stretch a dollar further than most," as someone put it. "We built our first bunker silo about 1950 and we've found the the most important things with this type of silo are to have earth covering the outside of the walls and to wilt the silage before you put it in," Mr. Dickinson says: "In our climate you've got to watch for frost damage. Eighty-five percent water or so in the silage will make it freeze easily. Therefore, it should be wilted down to 65 or 70 percent, he says. "and you should have earth covering the outside of the walls to keep the frost out."

Mr. Dickison has not found it profitable to use any cover on his silos. "We have two inches, at most, spoilage on top, covered or uncovered," he says. "But the more snow we get to cover the silos, the better. And of course we pack it well." Mr. Dickison feeds beef cattle out of one end of a silo with a 20-foot face. On this space he keeps 90 young cattle or 60 older cattle, and they're very happy this way, he says. For milk cows, he feeds out of a silo with a 40-foot face where he keeps 125 to 130 milk cows. "Six to 10 inches per head for milk cows is ideal," Mr. Dickison says. "Beef cattle should have much less face than milk cows. If you give cattle too much face they don't eat the silage back fast enough, it becomes less palatable and you'll have more freezing."

The silos on the Borden farm are built with wooden posts and braces and with the wall planks vertically arranged. The lumber is not matched and Mr. Dickison says he finds these rough planks serve the purpose well. The silo has a concrete floor and he feels this is a must for a self-feeding silo. When the floor was laid the surface of the wet concrete was gone over with a rough barn brush so the cattle would get a better foot hold.

Mr. Dickison is very satisfied with his bunker silos. In fact, he says, the large tower silos on the farm are now used for storing bedding.

The Mehlenbacher farm at Cayuga, Ont., has three bunker silos. They are all 26 feet wide and up to 80 steers are fed out of each. They have four-inch concrete floors and the tongue-and-groove plank sides are supported by iron pipe, about seven inches in diameter, encased in concrete. "We plan to fill the pipes with concrete, too, to get extra strength. And the wooden walls are treated with creosote but we plan to treat them this year again," Bruce Mehlenbacher says. He likes his self-feeding silos very

steps in making silage is to pack the green matter well in the silo. Most often, a medium-sized tractor is kept in the silo and driven back and forth across the heap. "Pack the silage—but don't overpack" is a good piece of advice. In general, it's important to wilt the silage since freshly chopped green matter will nearly always contain over 70 percent moisture. If the silage is over 70 percent and you put it in at that moisture content it's best to pack less than you would otherwise. Too much packing will give unpalatable silage with a strong odor, especially if it was put in with a high moisture content.

It's best to chop silage that is going to be self-fed. You'll have trouble, too, handling it when putting it in the silo and if you want to haul it out of the silo rather than self-feed. However, in some instances long silage may be good but you'll have to handle the packing differently.

From the management standpoint, the self-feeding bunker silo presents few problems. It's very important to provide as much wind shelter for the cattle as possible. It's also good to clean out the empty part of the silo from time to time to have a neat and well-kept silo. And at least two inches of face should be fed daily to have palatable silage and a minimum of frost damage at all times.

well and says they each hold about as much silage as three regular sized tower silos.

Filling a bunker silo may give you problems. The silage gets quite slippery and if you don't dump the loads in the right spots the grade at the end may be steep. Most farmers find they can fill the silo well simply by driving right through it and over the silage with a tractor and wagon and by unloading the wagon as they are on top. Bruce Mehlenbacher uses a home made winch, mounted on an old truck chassis. He unhitches the wagon from the tractor near the silo, hooks the wagon to the winch wire and pulls the wagon through. "But this is mostly because we sometimes haul the silage from fields two and three miles away and therefore load up the wagons as high as possible," Bruce says. With smaller loads, a tractor will pull the wagon through quite well.

The wagon should, of course, have some kind of self-unloading device. Mr. Harold E. Wright of the Agricultural Engineering Department, Ontario Agricultural College, says you don't have to go to the expense of getting one of the new PTO-operated self-unloading wagons, though they certainly would work well. A regular false-endgate type wagon will work as well as anything.

One of the most important

6 Keys to Dairy Farm Modernization

1. Weatherized large loafing shed
2. Streamlined modern milking parlor
3. Pipeline milking system
4. Combined hay storage & feeding
5. Centralized calf-raising program
6. Improved pasture management

Condensed from Western Dairy Journal

F. Leland Elam

USING three men 12 hours a day to tend a 100-cow milking herd is hard work.

Dale and Fred Scheller of Hillsboro, Ore., are dairymen who found themselves in such a position. But they did something about it. They put "six keys to modernization" to work.

Before the modernization program, the cow housing arrangement was awkward. During winter months, 60 cows were held in the main dairy barn, 24 in the old barn and 15 in a third building. Now, all the cows are under one roof and the third building has been turned into a machinery shed.

First Step. First key was construction of an 8,000 square foot, all weather loafing shed. It measures 40 ft wide and 200 ft. long and is designed to give cover to 130 milking cows.

Schellers, after considerable investigation, decided to build a metal quonset-type building. The quonset construction made it possible to place a metal covering in an arch to form both roof and walls. This gives a complete reflecting surface that kicks off the heat of the sun during hot weather. During the winter it's reflecting qualities help to retain the body heat of the animals so they stay warm and comfortable. A vent, the length of the top, gives air circulation which keeps the building from sweating.

Cows rest on a bed of shavings instead of a concrete floor. This helps udder bruises and has reduced mastitis to 2%.

A lean-to arranged the full length of the building on one side covers silage feeding bunks and cows stand on a concrete apron.

Schellers' records show the ani-

Reprinted by permission from Western Dairy Journal, Union Stock Yards, Los Angeles, California

mals now eat 12% less feed during the winter months.

This first key, the loafing barn, is the most important element in the entire modernization program. Its cost—$1.25 a square foot.

Milking Efficiency. Next step was complete reorganization of the giant old milking barn. One end is now a modern milking parlor. Originally there were 99 old stanchions and stalls. Now 16 streamlined stanchions serve the same purpose—with more efficiency.

Third key was the installation of a four-unit milking machine. Eight cows are milked while another eight are being prepared. Two men milk 50 cows an hour. Milk is piped from the cow to a 1,000-gallon bulk tank through a modern vacuum system. This has eliminated the handling of milking pails and cans. It cost $6,900 for this part of the conversion. Saving in milk handling and milking time is paying for this equipment.

One of the big chores used to be hay hauling. Now the cows come to the hay. This was the fourth key—a feed rack and shelter attached to the old hay barn. Hay is dropped directly into the feed rack from the barn loft. A passageway gives cows free access from loafing area to hay racks.

Fifth key was centralized calf raising. A portion of the barn that once was used for stanchions has become the area for raising replacement calves. This better control over the calves has cut death losses and reduced chore time.

Pasture Rotation. Pasture modernization became key number six. Gradually irrigation systems have been set out on the 90 acres of pasture.

Permanent fencing is used to divide the acreage into five acre units. The herd stays in one pasture four of five days then is moved on to the next. Pastures are arranged so that entry to all of them is from one long traveling lane.

A rotation program followed on the pastures allows the harvesting of about 400 tons of grass silage as well as plenty of winter hay. Cows live on the pastures from about March 20 to October 15. Combined with this is a crop harvest about May 10 which goes into silage. The last of June a second crop goes to hay. Six weeks later the third cutting again goes into the silos. Frequently, growth is sufficient for a second hay crop.

What have all these improvements brought to the Scheller dairy operation?

Two men now run the dairy in a seven hour day. This has meant reduction of labor costs, improved efficiency and wider margin of profit.

Making Grass Silage with Bisulfite

Most farmers are enthusiastic over this preservative. Here are some of the mistakes a few made last year . .

Condensed from Pennsylvania Farmer

Robert L. Cowan

IN January, 1954, Pennsylvania Farmer reported on the 1953 debut of sodium bisulfite on about 1,000 Pennsylvania farms. The results obtained by these pioneer farmers were apparently good enough to convince about 7,000-8,000 more to try this new preservation in 1954.

In general, the farmers are just as enthusiastic about the 1954 results are they were the previous year, and it is expected that many more farmers will try bisulfite in 1955.

Not only are old-time grass silage fans being converted to the new method, but also many who have never made grass silage before. When they see the high quality silage their neighbors make while they struggle to make hay, they decide that silage is the answer to the problem of harvesting the first crop at the early stage of maturity. Grass is most nutritious and palatable at a time when the weather normally prohibits haymaking, they say.

In view of the experimental results obtained by researchers, it is felt that bisulfite is well established as a silage preservative. Experiences of farmers confirm these findings. Any farmer can make good grass silage with bisulfite if he follows recommendations. The few cases of poor results which have been observed merely serve to emphasize the importance of following instructions.

Some of the most common mistakes made are:

1. *Ensiling grass that is overwilted or overmature.* Bisulfite works best on unwilted grass. Since this eliminates a lot of the weather hazard, it is possible to harvest the first crop at an early date before it gets too stemmy and coarse. Not only does this make better feed, but it eliminates the danger of poor packing in the silo which results in loss of the bisulfite and subsequent overheating and spoilage. Seepage may be a problem with high-moisture silage, although feed value losses in seepage are not serious. This nuisance may be overcome by providing adequate drainage.

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2. *Under-application.* A few farmers found, after they had their silos filled, that they had only put on four or five pounds per ton. Their silage in some cases came out dark and smelly, as if no preservative had been used.

Experiments have shown that anything under five pounds will not preserve silage effectively, and the closer to eight pounds the better. Most cases of under-treatment are felt to have been due to underestimating the weight of the loads of grass. One ton of grass occupies about 100 cubic feet of space when freshly chopped on the wagon, and not after it is settled in the silo. A ton of settled silage occupies only about half this much space.

3. *Overtreatment or spotty application.* A few farmers applied too much bisulfite. It made their silage unpalatable. If all of the silage was uniformly overtreated, usually the difficulty was due to miscalculation of the amount needed, through error either in arithmetic or in reading instructions. In a few cases, farmers applied the proper total amount of bisulfite but failed to get it uniformly distributed throughout the grass, so that certain areas received all of the powder and were thus overtreated and unpalatable, while the remainder was untreated and developed strong odors. This trouble was caused by short-cut application methods. The worst example was that of the New Jersey farmer who spread the powder over the top of each load of grass before dumping it into a trench.

Corn planter fertilizer equipment still seems to make the most reliable applicators, although with careful watching, gravity feed applicators have been used satisfactorily. Very little trouble with distribution of the powder was encountered where either of these types of applicator was used to apply the powder at the blower or on the harvester, a possible exception was one vacuum-type blower which seemed to suck the powder out of a gravity feed hopper too fast and was difficult to regulate. Most of the commercial applicators available are still in the development stage, but some improvements were promised in 1955 models.

Information as to the best ways to apply bisulfite to grass silage is available from your state agricultural college.

It's not only humane but smart to rest that porker before you give him the axe. Recent research shows pork from hogs allowed to rest 12 to 24 hours before killing lasted longer in freezers than pork from tired hogs.

A Test for Hog Efficiency

How would you like to own sires and dams certified on consistent production of big litters of fast gaining pigs that dress out high in valuable cuts?

Condensed from Breeder's Gazette

Wilbur H. Bruner, Ohio State University

FOR years Ohio has had a quality hog marketing program. It's paying off in real dividends every day. Hog men are taking advantage of the program by selling their meat-type hogs on a live graded basis. Market hogs in the top price weight bracket (180-220 lbs.) are live graded as to quality and sold on a price differential basis. Hogs are also being sold daily on their merit in auction and other markets.

The Ohio Swine Improvement Program is a selection program. Breeders and commercial producers have joined with other agencies to incorporate the Swine Improvement Association of Ohio —the official body governing the program. Started in 1948 the program has continued on a statewide basis. Including the 1954 spring litters, records show that 791 litters of prospective breeding stock have been nominated. Of this number 462 litters made the weight standards established by the association; 192 have been Ohio certified, representing 8 of the major breeds.

Litters are certified, with a certificate awarded to each boar or gilt intended for breeding purposes, when they have achieved the following standards:

1. *Farrowing requirements* — At least 8 live pigs. Litter, sire and dam to be free from such defects as swirls, ridgling, rupture, inverted teats, etc.

2. *Weigh days and standards*— Those prescribed by breed association may apply. For breeders not entered in a breed production registry program the association recommends weighing at 35 days.

3. *Gaining ability* — The association requires that meat-type breeding stock shall be efficient in gaining ability. It requires that two pigs per litter be consigned for slaughter and average

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

200 pounds at 180 days of age or younger.

4. *Slaughter test* — The two pigs tested are then slaughtered at about 210 pounds. The litter may then fall in certified classes depending on the percentage yield of the trimmed primal cuts. This yield is found by dividing the total weight of the primal cuts (trimmed loin, skinned ham, New York shoulder and trimmed belly) by the live slaughter weight. The slaughtering and securing of all carcass data is done at the Meats Laboratory, Ohio State University.

In the late fall of 1954 Ohio breeders had offered to them the facilities of a swine evaluation station. These facilities were provided by Ohio State University on a farm located near Columbus. The main objectives of the Swine Evaluation Station Program are: (a) to assist in selection and recognition of breeding stock from herds that will improve production efficiency and the market value of the commercial hog crop. (b) Provide 108 pen stations where breeders may have 2 pigs per litter fed under uniform conditions of feeding and management. (c) Determine the feed efficiency, rate of gain and carcass value of prospective breeding litters through records secured on two pigs per litter.

A breeder interested in the evaluation station program nominates a litter within 10 days after farrowing and pays a nomination fee of $2.00. A representative pair of pigs (barrow and gilt if possible, otherwise two of the same sex will be accepted) are selected at weighing time to be entered in the station. The breeder, county agent and Vo-Ag teacher weigh the litter and make selection of the pair.

The pigs are delivered by the breeder to the station on or before they are 60 days of age and must have been treated for cholera before entering the station. A health certificate is required on each pair of pigs. The entrance fee for a pair of pigs per litter is one pig. The other pig of the pair is purchased using the following formula: current top hog market price x 1½ x average weight of the 2 pigs.

All pigs in the station are self-fed a standard ration and started on feed at 63 days of age. Record of feed consumed by each pair of pigs is kept. The feed standard is 370 lbs of feed or less per 100 lbs of gain while on test. The individual pens in the station for each pair of pigs are 6 ft x 12 ft. and are equipped with uniform feeders and waterers. Pigs are weighed individually at bi-weekly intervals and are kept on test until they individually weigh 210 lbs.

Sixty-two different breeders representing 9 breeds nominated

174 litters last fall. Fifty-four breeders from 27 counties entered 104 litters in the station. As of Feb. 21st, 136 individuals had reached the 210-lb. weight and were slaughtered.

The Ohio Swine Improvement Association located 17 Superior litters among the first 40 pairs slaughtered. To rate the Superior certification, the 17 pairs of pigs had to produce 49% or more of their live weight in the 4 primal cuts, produce 100 lbs. gain on less than 370 lbs. of feed and weigh 200 lbs. in 180 days or less.

Litters from the station are certified Ohio Commercial if they produce 47 to 49% of their live weight in primal cuts and meet the same feed and weight standards as for Ohio Superior. Litters below these standards are not certified. The average of 324.8 pounds of feed was required to produce 100 lbs. gain for the 17 pair rating Superior and their average age at slaughter was 158.6 days. All records made on each pair of pigs at the station and slaughter test are made available to the breeder.

Another portion of the Ohio project is the field or farm program. In this program pigs are raised by the breeder until they reach market weight. Then a pair of pigs from the litter is brought into the University to secure carcass data. If the pair of pigs average 49% or more of their live weight in the primal cuts the litter will be rated and certified Ohio Improved, and if the primal cut yield is 47 to 49% the litter is rated Ohio Commerciay. In this program, litter size and weight, gaining ability and carcass value are the standards for certification.

A Proven Sire in the Ohio program is a boar, from an Improved or Superior litter, that sires 5 Improved or Superior litters from 3 or more sows. A Proven Dam is a sow, from an Improved or Superior litter, that raises 2 Improved or Superior

Rations Fed at Swine Evaluation Station

	Ration No. 1 for pigs up to 120 lbs.	Ration No. 2 for pigs 120 lbs. & up
Coarsely ground shelled yellow corn	1303.0 lbs.	1439.0 lbs.
Finely ground oats	250.0	200.0
Meat scraps	144.0	102.0
Soybean oilmeal	164.0	116.0
Dehydrated alfalfa meal	100.0	100.0
B-vitamins, antibiotic, yeast pre mix* (incl. 0.5 % soybean oilmeal)	17.2	17.2
Mineral mixture	22.0	26.0
TOTAL	2000.2 lbs.	2000.2 lbs.

Ration No. 1 contains 15.5% crude protein; No 2, 13.6% crude protein.
***Premix consists of 2.5 lbs. B-vitamins concentrate; 1.7 lbs. B-12 supplement; 2.8 lbs. antibiotic supplements; 0.2 of a lb. of irradiated yeast, and 10.0 lbs of saybean oilmeal.**

litters. A Certified Mating is a repeat mating of a boar and sow that have already produced an Improved or Superior litter. Repeat litters, to be eligible for certification, must be officially nominated and meet the association standards for litter weights.

The Swine Improvement Association of Ohio is dedicated to finding the superior stocks that exist, to reorganize them officially, and to promoting their proper and expanded usage.

Farm Prices Decline More Than Income

"Agricultural prices have gone down 33 percent in the past 24 months," Stanley Andrews, former head of the federal government's Point-4 program relates.

"By increasing their production," Andrews pointed out, "America's farmers have been able to hold their income decline to 25 percent in the last four years—to only 5 percent in the past year. That tends to prove the classic theory that price times volume is the true gauge of farm prosperity instead of mere price.

"The joker in this situation, though, is that this extra volume has not gone to the market place but has been bought and is being held by the American government.

"We have an agriculture with an overexpanded plant. During the war we fed ourselves and supplied about 18 to 20 million tons of food and fibre to feed and clothe other peoples. Now their economies are back on a pre-war and better basis. We are producing more than either the world market or our own national market can effectively absorb. Yet there's going to be a not-too-distant day both our nation and the world is going to need the full capacity of that plant desperately."

Andrews also commented on the money it takes to farm today. "In 1875, agriculture required $2900 per worker in capital. It requires $7800 now. It took a farmer about nine years to go broke 80 years ago. He can do it now in about 20 months.

"Twenty-five percent of our farmers are advancing rapidly in terms of latest practices, economic improvement and strengthening of their business. A much lesser group is barely holding its own and some 60 percent are falling behind.

"A shake-out is predicted of what some call one million inefficient and marginal farmers. Who is very vulnerable to such economic action? Some 800,000 young men and women who have entered farming since World War II and had to pay high prices for land and equipment. Yet these young people represent our agriculture of the future."

Washington State College

Top Beef Feeder

Looking for ideas to give you more profit from beef-feeding? Perhaps the Housers of Illinois have the experience to help you out . . .

Condensed from Successful Farming

Robert R. McCain

"BUY good cattle and feed them efficiently," is the advice of livestock men these days. And it's sound advice. The only trouble with such advice is in *putting it into practice.* It's not always an easy job. You have to work at it. Ivan Houser and son, Eugene, Farmer City, Illinois, *do* work at becoming more efficient feeders, and the extra attention to details has paid off.

The Housers would be the first to say that they haven't found all the answers to making money from beef feeding. But they have put a good many moneymaking ideas into practice—ideas that you may be able to use on *your* farm.

Mr. Houser has been feeding cattle for 25 years. One conviction of Ivan's is that it pays to buy the quality of calves that can be fed out to Prime beef finish. "That gives a longer possible holding period to hit the very best markets. If we bought lower-quality animals we couldn't do it," said Ivan.

Management records are kept on the beef-feeding enterprise. And Eugene continually studies these records for new ways to produce beef cheaper.

This careful study to improve feeding efficiency resulted in a return of *$117 for each $100 worth of feed put into 186 head of cattle marketed in 1952.* If you fed cattle in 1952 you know how tough it was to make money. The Housers were $17 to the good on every $100 worth of feed in spite of the fact that *the cattle sold for $5.44 per hundred less than the cost of the feeders.*

Here are the figures on 208 head of cattle fed last year. The cattle were bought September 5, 1953, and sold August 1, 1954. The cattle weighed 384 pounds

Reprinted by permission from Successful Farming, Des Moines, Iowa

at buying time and 991 pounds when sold. When sold, the cattle returned $127 for every $100 worth of feed fed. Cost of gain was $19 per 100 pounds. The cattle cost $22.89 and sold for $23.94 per hundred.

According to a complete summary of the feeding operations of all the cooperators in the Farm Bureau System in Illinois, the Housers feed more protein and minerals and less corn than the average of all the feeders with comparable cattle. The Housers also get about .3 pound more daily gain at less cost than the average of other feeders.

Roughage makes up a good share of the Houser's ration. Here's the breakdown on feed fed per 100 pounds gain: Corn, 9.3 bushels; protein and minerals, 94 pounds; corn silage, 253 pounds; straw, 2 pounds; clover hay, 80 pounds; pasture, 2.7 animal unit days.

The Houser program doesn't call for cattle to run on pasture for a very long time. Eugene likes the idea of keeping cattle in dry lot for two important reasons: (1) All weight is honest weight and (2) you can control marketing time.

Eugene cites the market conditions of April, May, and June, 1953, as an example of point 2 above. Beef prices were jittery at that time and most feedrs had their cattle on pasture. Then, in July the market started to climb and these feeders couldn't get their steers in market condition in time to take advantage of the best prices. The Houser steers were on full feed in dry lot and were at a good weight, ready for market.

"This is where buying only good calves and keeping them in dry lot proved out," said Eugene. "We wouldn't have been able to hold them for the good market if they had been lower-grade calves.

"And when you get your cattle to market, you can 'fib' when they ask you if the cattle have been on grass, but it won't do you much good. Those buyers have been in the business a long time and can tell when a steer has had grass and when he has not."

The Housers operate 560 acres, including 150 acres of permanent pasture. To utilize this permanent pasture, they run a commercial herd of 50 beef cows. Those cows never get any grain other than what they glean from the picked cornfields each fall. The cows are roughed through the winter on hay and stay on pasture and stalk fields the rest of the year.

It costs only $1,400 a year to support those 50 cows and 2 top-quality bulls. That amount in-

cludes paying rent on the pasture, cost of hay in winter, and interest. So far, the Housers haven't failed to get at least a 100-per cent calf crop each spring. That means it costs only $48 a calf for the home-grown animals.

"That's a low price in comparison to what we pay for calves from the range. Those 50 or so calves each year have helped us cut down the over-all cost of purchased calves. It makes a difference in the profits at the end of the feeding season," said Ivan.

The cow herd is due to start freshening late in March. During this calving period, one of the Housers will walk through the cow herd at least once a day. When a new calf is found, it is immediately dehorned and castrated. The Housers have not lost a calf by doing these two jobs at this early age.

It's one thing to make up an efficient ration, and another to get it into the feed bunks. The Housers have worked out a pretty good system for doing this job, too. The feeding plant consists of a big 90′ x 120′ shed with a 14′ x 50′ silo—154-ton capacity—at the south end.

One big laborsaver is the silage cart, which uses the sides of the feed bunks for rails. These bunks are inside the big shed. Baled hay is stored along the west side of the shed in a 20′ x 120′ space with hayracks right next to the hay. A big water tank directly in the center of the shed has never frozen over.

The supporting poles in the shed area are 20 feet apart so a manure spreader can be moved around easily in any part of the shed. Cobs are used for bedding on the concrete floor and a tractor scoop removes the manure. About 500 tons of manure are hauled annually.

A 60′ self-feeder was built along the north wall of the feeding shed. A self-unloading wagon is used to fill this feeder. A burr mill grinds right into the wagon at the corncrib. The wagon is then pulled up to the commercial-feed platform in the shed. This platform is truck-and-wagon height so there's no tough lifting and carrying of feed bags. Another big self-feeder is located outside the shed on the 60′ x 85′ concrete feeding floor.

Although machinery does most of the actual labor on the Houser farm, there's one chore these beef feeders don't mind doing themselves. That's keeping, studying—and using—records. Although the Housers are probably more efficient than 90 per cent of this country's cattle feeders, they still are seeking better ways to improve efficiency and make cattle feeding more profitable.

"Worth Repeating"

A story told about Calvin Coolidge supports the theory that his taciturnity was deliberate and planned. Shortly after his inauguration, his successor as governor of Massachusetts visited the White House.

"Look," he said, "there's just one thing I'd like to know: When I was your lieutenant-governor I watched you, day after day, finish your work and leave your desk by five every afternoon. I have precisely the same duties—and I'll be darned if I can clear things away before nine or ten at night. I can't figure it out, Cal. Can you?"

Coolidge almost let a smile break through. "You," he said, "talk back."

* * *

Here lies the body of Jonathan Gay;
He died maintaining his right of way.
He was right, dead right, as he sped along.
But he's just as dead as if he'd been wrong.

From *Country Guide,* Winnipeg

The circuit rider was asking the hillbilly girl if he could speak to her father.

"Naw, sir," said the girl, "Daddy's in the pen."

"Well then," said the minister, "what about your mother?"

"Mamma's in the county sanitarium," said the girl. "She was seein' things."

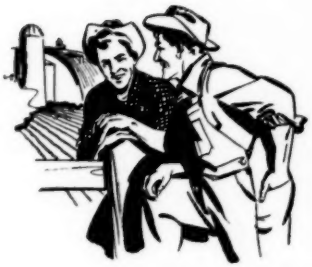
"Perhaps I could speak to your brother," said the minister.

"Naw," said the girl, "he's away at Harvard."

"Oh," said the minister, brightening. "That's fine, what is he studying?"

"He ain't studying nothin'," said the girl, "they're studying him."

Bureauscope



Land Prices Up

Latest reports show land prices have reversed a three year decline despite income slump. Buyers have to wait . . .

Condensed from Wall Street Journal

Winston C. Fournier

FARM land prices, sagging for the past three years, have surged upward this spring.

"In good land areas prices for farms are higher now than they have ever been—including 1919 and all the other peak times," says Paul K. Justus, head of the farm loan department of General Life Insurance Co., St. Louis, which makes loans in 29 states.

Paradoxically, this upturn has taken place despite the long slide in commodity prices and farm income. Farm real estate men explain this by saying the trend of farm commodity prices and rural income has leveled out. Some farmers are buying more land so they'll be able to work the same number of acres, despite restrictions on plantings resulting from the Government's price support program. Others are finding mechanization enables them to farm more land without additional labor. Investors have stepped up buying of farms too.

Stock Market Money

"We know of instances where people have made money in the stock market, but are scared now because security prices are so high," one farm real estate man relates. "They're putting their money into land because it's a more stable investment."

Farm management advisors say investors still can make a 6% return on the money they put in farms. "Once in a while, we're still able to find a steal that will make an 8% or 9% return," an Iowa farm manager says.

Along with rising prices, rural real estate specialists say the volume of farm land transactions is mounting. In some areas would-be buyers have to wait a while to spend their money. Farm land sales volume had been in a steady

Reprinted by permission from Wall Street Journal, Chicago 90, Illinois

decline since a record peak in 1946; land prices, though, kept rising until 1952. The number of transactions continued to lag during the land price fall-off of the past three years.

Roughly the same factors that underpin rising prices—desire for more land, mechanical efficiency gains and ready money—explain the increasing transactions, real estate folk say.

Some of the advances in prices being paid for farms are in sections where the Government has ordered sizable slashes in planttings of price-propped commodities. Real estate men say an intangible but potent rural confidence in the long-range profits from farming explains part of this seeming inconsistency. Also, some individual farmers want to keep their gross income up by selling the same amount of food or fibre as before planting cutbacks. So they buy more land to get a larger allotment base.

Demand in Dixie

Southern farmers have suffered sharp cotton cutbacks, but they're eager to buy cotton land. One reason is that cotton prices have held up better than some other crops, sometimes exceeding the support level. And the Southern farmer may have a better chance to plant alternative crops, such as corn and soybeans, than wheat growers in drier areas.

Cotton lands in the rich soil regions of Mississippi and Arkansas are bringing $50 an acre more in just the last six months. "That's an increase of 15% to 20% and the fastest rise of any peace time," says J.N. Moffett of the Doane Agriculture Service Memphis Office.

"Near Greenville, Miss., several pieces of good Deer Creek land have sold this spring for $225 to $275 an acre. Last October they wouldn't have brought over $175," observes Neeley Bowen, a Memphis farm land dealer, 35 years in the business. "I think prices down here will get stronger. After all, we've had three dry years and still prices have gone up."

In the "bootheel" of southeastern Missouri, another top cotton producing area, much the same thing is happening. Mr. Justus of General American Life tells this story:

"I recently sold two farms I owned down in southeast Missouri. One of 160 acres went for $325 an acre. A year ago I offered it for $265 and got no takers. The other, 320 acres, went for $300. A year ago I was trying to get $250 an acre for it. Back in 1949 I offered this farm for $48,000 and couldn't sell it; this spring it brought $96,000."

In Kansas, where acreage restrictions have forced cuts in the planting of wheat, land prices are

up a little in places that haven't felt the full brunt of the drought.

Holding On To Land

In central Kansas, for example, E.W. Mc Naghten Loan Co., Hutchinson, Kan., tells about a quarter section (160 acres) that sold this spring for $225 an acre. Last fall, he says an offer for $200 was turned down.

Even in the western part of the state, where drought conditions are bad, there's been little depreciation in farm lands, Mr. McNaghten says.

"There's not much being sold out there, but then there isn't much being offered for sale. Farmers have it free and clear and are holding on to it," he adds.

In the Corn Belt, where farms yield a good return in most years prices for the better land are up.

"About a month ago an 80-acre farm with buildings, south of here, sold at auction for $401 an acre." said Ralph Olson of the Doane office in Ames, Iowa, in the center of the state. "A year ago that place probably would have brought $375 and two years ago $360 would have been top price."

"Good quality farms in our area are up 10% since last fall," reports Jack Dominic, a real estate dealer in Clear Lake, Iowa—in the north central section of the rich corn-hog state. But poorer quality land is steady to weak, he says.

If farmers don't have all the money for a farm, they generally find a lender eager to help out, at a relatively cheap 4% to 4½% interest rate. "Up our way, agents attend all the land sales, watch who buys and then almost pounce on him to lend him money," says Mr. Olson of Ames. "A buyer can have his choice of five or six places to borrow money right on the spot."

In many cases, though, farmers plunk down cash for land.

Wisconsin Prices Down

There are a few sections where farm prices are still headed down. In Wisconsin, for example, lower prices for dairy products—largely resulting from a drop in support prices last year to 75% from 90% effect land prices. Joseph T. Kelnhofer, supervisor of the Elkhorn branch of the Thornton Finance Co, Fond du Lac, a firm which specializes in farm auctions and mortgage loans, estimates value of farms in his area has slipped $5 to $10 an acre in the past year. Farms thereabouts range in price from $100 to $350 an acre.

Farm land prices generally hit their record high in 1952 after a steady climb from the lows of the depression 1930's. But farm income started to slip from its post-war highs in 1951; farm real estate followed in late 1952. By

last fall farm land prices were nearly 5% under the peak.

Farm commodity prices still average 5% under a year ago and prospects for the remainder of the year point to nothing better than holding at present levels.

The dim prospects for an upsurge in crop prices isn't checking demand for rural real estate though.

"In the past 12 months we've sold two and a quarter million dollars worth of farms," reports Gale T. Tucker, partner in National Farms Co., Omaha, Nebr. "Normally, we move around $2 million worth a year, but in 1953 it dropped well below $1 million."

From Illinois come reports by real estate men of a "very marked increase in transfers." In Iowa "there's quite a bit of activity—more than in the last couple of years," they say.

Demand Going Up

Though farmland transactions are up, demand is up more. The majority of farmland buyers and would-be buyers these days are farmers wanting to increase their holdings or tenant farmers who have accumulated enough money to own a farm themselves. But there has been a significant increase in the number of city investors looking for land in many sections of the country.

"My big problem these days is getting farms for sale," says Iowa's Jack Dominic. "Right now I have orders from six or seven Eastern men that I'm trying to fill. Last year I had only one order on hand at this time." Mr. Olson in Ames says doctors, lawyers and a professor at the University of Iowa are looking for good buys in farm land. "We've had more people inquiring about buying farms in the past 60 days than we had in all of last year. We don't have to list a farm very long, if it's priced anywhere near right."

In central and western Kansas it's the same story. "We could sell a lot more land, if it were offered, without hurting prices one bit," says Ed McNaghten of Hutchinson. "We've got a lot of investors ready to buy."

Mr. Bowen, who's sold more than 2,000 farms and plantations in his 35 years of experience, says, prospective buyers have increased 50% in the past year. But you can hardly find land for sale."

Farm records each year are becoming more important. Accurate records of production reflect the year's activity and should be the basis for expanding or curtailing farm practices and cropping systems. They are easy to keep and will prove invaluable when it's time to evaluate each farm enterprise.

Advice to Young Farmers . . . .

How To Catch and Keep A Wife

There's a girl shortage on the farm . . . and the farm wife of yesteryear is a fast vanishing species . . .

Condensed from The Young Farmer

Prof. A. F. Wileden, University of Wisconsin

DID YOU ever stop to think that two of the most important decisions a man makes in his lifetime are usually made between the time he is twenty and thirty years of age?

You don't have to scratch your head very hard to figure out what these decisions are. First, what will you choose as your occupation? And second, who will you choose for a wife (or vice versa)!

Sure, you have already been thinking about both these questions. And because you've been thinking, you realize that they are closely related. You have been thinking about them ever since you asked Jane for that first high school date.

But now maybe you're out of high school, working on the home farm. That pretty well solves the first big decision for you.

But that second decision, whom you are going to marry, is still a long way from settled. You've been dating Jane a lot lately but now she is talking about working as a stenographer in a law office in the city one hundred miles away. You're probably wondering just where this leaves you. And a quick check of the other girls you know doesn't ease your mind much. Most of them are going to the city, too. That is, all of them except those who are already married or who are "going steady."

All at once you discover that while you've been making up your mind to be a farmer—and have been putting in a lot of time learning to be a *good* farmer, Jane has been making up *her* mind to go to the city.

She wasn't taking that high school commercial course just to have something to do. Jane, like

Reprinted by permission from The Young Farmer, Minneapolis 1, Minnesota

her friends, wants to be independent—wants to earn some money of her own. Besides, the city seems like a very interesting place to live. Lots of things going on—lots of things to do. In comparison, the small country town looks pretty dull.

Does this leave you out in the cold? Of course not. Jane doesn't want to be a "career girl" forever. She'll trade her typewriter for an apron as soon as some enterprising young man persuades her to do so.

But it does mean that you're going to have a tougher time getting her to come back to that farm of yours. You're not alone with the problem, however. The same situation is faced by young farmers all over the country.

You see, Jane is doing what most other farm and small-town girls are doing today. About three out of every four of them leave home when they graduate from high school and go to a city for a job or go away to college. This is an age when women have more opportunities than they had even a generation ago and they are not as easily satisfied as in your mother's day. One reason we have so many divorces is that men often fail to recognize that opportunities for women are different in our modern world.

What does this mean to you as a young man looking forward to getting a start in farming? Farming is a family business, and the young farmer without a good wife is in for some rough going. And farmers' wives are not as easy to find as they used to be. Your father probably married the girl down the road or, perhaps, the one-room school teacher. Your older brother may have married a girl from over in the next community.

But the odds are different for you now. Today there are only about half as many young women of marriageable age living in the country as there are young men. In other words, young women from rural areas are migrating to the cities at a younger age and in about twice the numbers as are young men. This means that many young men on farms today are confronted with a serious problem in finding a wife. Either they must marry a city girl and help her learn how to become a farmer's wife or follow the farm girl to the city and persuade her to come back to the farm.

And not the least of the problem is convincing Dad that dating that girl one hundred miles away once a week is as important to you today as it was for him to date the girl just a mile down the road. It is going to take a lot of gas and oil and traveling to places your folks know little or nothing about.

But you have even another problem that is bigger than that

confronting your father during his courting days. This problem is symbolized by that shiny convertible that makes the trips seem so short and the courting so pleasant. The girl today who has experienced the call of the bright lights and conveniences of the city will not be satisfied with less in the country. Running water in the farm home is just as important to her as running water in the barn. That wasn't the situation in your father's day nor is it the situation in many farm homes today.

Certainly "a house with a path" has no appeal to a girl who is accustomed to a "house with a bath." In other words, her standard of living includes good housing and modern conveniences. She may prefer to remain single rather than sacrifice those conveniences. She has also discovered that there is opportunity for her in the city, even though she is unmarried. Better be ready when you "pop the question" to make some promises for that farm home of the future as well as to tell her how beautiful she is.

The problem you face doesn't stop at the home either. The girl you may hope to marry and expect to be the mother of your children is also concerned about the community in which she will live. She will want good schools and good churches. She will want readily available health services and recreation facilities for the children. Don't be surprised if she refuses to live in a community where these are not available.

Women are usually more senitive to these things than men and look farther into the future. Better be thinking about some of these things, too, if you really are in earnest about the girl of your dreams.

Don't get the wrong impression, however. It should be pointed out that the bargaining is not all on the girl's side. The girl who is trained and has experience in earning her own living, and also has experienced urban living, brings many advantages to the family.

She is experienced in the business world and is a helpful partner in making tough decisions—and farming today involves the making of many tough decisions. She has learned what earning money really means and the importance of meeting an obligation once it has been undertaken. If necessary, she may even get a job to supplement the family income.

More than that, she has ideals of family living that will make the home a place of inspiration. It is these ideals that have taken her to the city, if she was a country girl. And it is the opportunity for the realization of these ideals that will bring her back to the farm. Studies have shown that a happy well-managed farm

home is as great an asset to successful farming as is the well-managed farm itself. It pays off in dollars and cents as well as in human values.

Farming is a family enterprise and the young farmer who wants to be successful had better recognize this fact. Marriages may be "made in heaven" but their continued success depends upon what happens in the home right here on earth. This holds for the farm as well as the city. The farm family of today is no longer just rural; it is urban as well. The successful farm family is becoming more and more the reservoir of the best in both city and the country. It is a realization of this fact that should hold young men in the farming business and attract to it as well the finest young women both from the farms and the cities.

Certainly the farmer of the future should expect and accept no less than his city cousins. So it is only fair that the farm woman of the future will expect and accept no less than her city cousins.

With the decreasing number of farms and the increased size of farms, it becomes obvious that each individual farm is becoming more and more important. Furthermore, each farming unit is becoming a more critical business operation. It is going to take the best trained young men and the happiest young women working together to make a success of it.

Take heart, young farmer, for in your success rests the hope of agriculture. Look well beyond what the eye can see when selecting your helpmate. Go to the city to get her, if need be. Listen to her as you make your plans. If you do your part, it is an almost sure bet that she will do hers—and more.

Careful . . . How You Store Chemicals

Clamp the lid tight on containers of farm chemicals. Even then, store them out of the reach of children, animals—and seed grain.

This advice comes from the University of Wisconsin. Specialists warn that a pound of 2-4,D—an effective weed killer—can kill the germination on three to four thousand bushels of seed if the chemical is stored in a granary.

The milk house is also a poor place to store chemicals, they say, as milk easily picks up odors. A dry machine shop or shed is the best place to keep farm chemicals. Special chemical storage buildings aren't practical on most Wisconsin farms. Also keep all containers labeled, the specialists advise. If you're not sure which chemical is in which can, get rid of it.

Seed for Tomorrow's Grasslands

New National Seed Projects get seed of new, improved varieties to you years earlier . . .

Condensed from Soil Conservation

G. S. Garrison

TIMES are changing for the better when it comes to forage crops. Fifteen years ago there were few improved varieties. Certified seed was in small supply and often was priced too high for farmers to buy. Today, however, many farmers are obtaining bigger yields and better quality forage because they plant seed of superior varieties.

Recent experiments have shown that improved meadows and pastures can be made to produce as high a total of digestible nutrients per acre as high-yielding corn crops—and at less cost and less labor. Furthermore, acres planted to improved forage crops help to reverse the downward trend in soil productivity brought on by the intensive use of soil-depleting crops.

The United States Department of Agriculture and state experiment stations have put more scientists to work breeding better varieties and studying seed production. State certifying agencies have expanded to handle a much greater volume of certified seed. Special certification standards have been developed to permit the production of seed in the most favorable seed-growing areas.

Because of special problems, maintenance of ample seed supplies for many forage crop varieties becomes a national consideration. It was to assure adequate breeder and foundation seed, that the work under the National Foundation Seed Project was initiated in 1949.

It is impossible by visual or rapid test to differentiate between the undesirable seed or plants and those of superior varieties. Thus, breeder seed must be fed continually into the seed-increase program. This is the only way to prevent the partial or complete loss of such attributes as disease

Reprinted by permission from Soil Conservation, Washington, D. C.

resistance, winter hardiness, vigor, and other desirable characteristics, as a result of the introduction of impurities. Most species of forage crops are cross-pollinated; this offers one of the serious hazards in maintaining varietal purity in the seed-producing areas where other strains are being grown. Volunteer plants in a seed field can cause changes in the variety. And mechanical mixing occurring during seeding, harvesting, or cleaning is another place where varietal purity can be lost.

Thus, multiplying a handful of breeder seed of a new forage variety to millions of pounds of certified seed for farm use has its difficulties. Seed buildup in the past has broken down before volume production was reached. The breakdown often occurred in the foundation seed stage. This was either because of failure to produce the amount of foundation seed needed to build up and maintain the desired production of registered and certified seed or because the demand for seed was so great that much of the first increase, instead of being put back into the seed buildup, was siphoned off and used mainly for hay, pastures, and soil improvement.

The Foundation Seed Project represents a new approach. It was shaped to meet the exacting needs of the forage-seed industry. Through the project there have been brought together the facilities of federal and state agencies and of the commercial seed trade in one organized effort to provide farmers with all the certified seed of new and superior strains of grasses and legumes they need.

The Foundation Seed Project is guided by a 16-man advisory committee called the Planning Conference. Its membership represents state experiment stations, the International Crop Improvement Association, the American Seed Trade Association, and the U. S. Department of Agriculture.

The Planning Conference, in turn, is advised by the Regional Forage Crops Technical Committees. There are four such committees in the United States, one in each of the four experiment station administrative regions. The states within each region have similar problems and environmental conditions.

These technical committees recommend to the Planning Conference the varieties to be included in the project, the regions of adaptation for forage and seed production, the estimated certified seed requirements, the areas for the production of foundation and registered seed of each of the varieties, and many other items of value in arriving at a rapid buildup of seed supplies.

All arrangements for seed pro-

duction within each state are the responsibility of the state foundation seed representative. Actual production is done by growers and seedsmen who are able to meet the state certification requirements.

Officials of the originating sta-

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known to be capable of producing foundation seed. He arranges for production contracts of the foundation seed at a guaranteed price. All growers who receive breeder seed must agree to make available all foundation seed produced to the state representative and, through him, to the Project and the Planning Conference. All of it is assembled and stored in approved warehouses.

Upon the recommendation of the Planning Conference, the foundation seed is allocated to the states. It again goes to the state representative who, working through the local setup, allocates it to growers and seedsmen for the production of registered or certified seed. Normally, registered seed is distributed by growers or seedsmen as planting stock

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Altogether, the 1954 production of the five superior varieties of alfalfa is estimated at over 43 million pounds. This compares with a total of around 1.4 million pounds in 1949, when the project was started.

The success of the Foundation Seed Project in building seed supplies of Vernal alfalfa shows how the time has been short-

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How Much Is Farmer's Digest Worth?

"I enjoy Farmer's Digest and find it so valuable that I would like you to quote me a price on all issues since 1945. I will bind them and have a complete library for reading and reference."

* * *

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* * *

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All arrangements for seed pro-

duction within each state are the responsibility of the state foundation seed representative. Actual production is done by growers and seedsmen who are able to meet the state certification requirements.

Officials of the originating station agree to make all breeder and foundation seed of an accepted variety available to the Planning Conference for allocation. Upon recommendation of the Planning Conference, the project personnel allocates the available breeder seed for planting in states best suited for the production of foundation seed.

The state allotment of breeder seed goes to the state representative. With the aid of the experiment station group that makes stock seed releases, the latter allocates breeder seed to growers and seedsmen who are known to be capable of producing foundation seed. He arranges for production contracts of the foundation seed at a guaranteed price. All growers who receive breeder seed must agree to make available all foundation seed produced to the state representative and, through him, to the Project and the Planning Conference. All of it is assembled and stored in approved warehouses.

Upon the recommendation of the Planning Conference, the foundation seed is allocated to the states. It again goes to the state representative who, working through the local setup, allocates it to growers and seedsmen for the production of registered or certified seed. Normally, registered seed is distributed by growers or seedsmen as planting stock for the production of certified seed. Certified seed is moved through the normal seed trade channels, since much of it is produced 1,500 miles or more from the consuming area.

Among the better known improved varieties included in the project are: alfalfa — Ranger, Buffalo, Narragansett, Vernal and Atlantic; red clover — Dollard, Kenland and Pennscott; sudangrass — Tift; and lespedeza — Climax. Certified seed supplies of these superior forage crop varieties are larger than at any time since they were introduced. Seed of several of them will be sufficient to meet planting needs in 1955 as a result of the cooperative work by the National Foundation Seed Project.

Altogether, the 1954 production of the five superior varieties of alfalfa is estimated at over 43 million pounds. This compares with a total of around 1.4 million pounds in 1949, when the project was started.

The success of the Foundation Seed Project in building seed supplies of Vernal alfalfa shows how the time has been short-

ened between release of a new variety by an experiment station and availability of seed to the farmer. Vernal was approved by the Planning Conference in February, 1953. Foundation seed fields were established in Utah and Washington 2 months later. At the end of 6 months there were 9,600 pounds of foundation Vernal. The foundation seed was allotted by the Planning Conference to the states interested in producing seed of this variety. As a result of this cooperative effort, 2 million pounds of certified seed was available following harvest in 1954—only 18 months after the initial plantings were made with breeder seed. In contrast, there were only 1,101,231 pounds of Ranger and 14,568 pounds of Atlantic, 6 and 8 years, respectively, after their release.

Certified Kenland red clover seed supplies for 1955 plantings total about 2.5 million pounds and Pennscott red clover 340,000 pounds. The increase of Dollard red clover will get started this year. It is a new variety, adapted to the Northern States in the Central Region.

The production of large crops of foundation seed the year of seeding is making possible the rapid buildup of certified red clover seed supplies. A 27-acre field, planted in the spring with 21 pounds of breeder Kenland seed, produced over 600 pounds of foundation seed per acre 6 months later. The following year another seed crop of 650 pounds per acre was harvested making a total production of 34,910 pounds of foundation seed from the field. Thus, for every pound of breeder seed planted, there was a return of 1,293 pounds of foundation seed.

Similar results have been obtained with Pennscott. The certified seed buildup of this variety will be rapid, as a large supply of foundation seed is available to registered and certified growers.

Use Stilbestrol Only For Fattening Cattle

If you're using stilbestrol feed to fatten cattle, better make sure that no other animals get it.

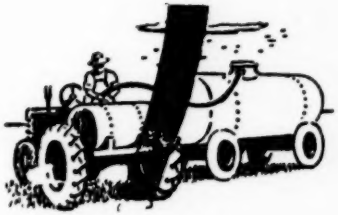
That is a warning from Michigan State College animal husbandmen. The hormone, which can be sold to farmers as a part of a feed mix, may harm other livestock.

The federal food and drug administration has approved its use in feeds only for fattening cattle intended for slaughter. That means, say the animal husbandmen, that it should not be used for breeding stock—either dairy or beef—at this time. It should not be fed to sheep or swine either, the specialists add.

Michigan State College

Questions and Answers About

ANHYDROUS AMMONIA



Condensed from a Mathieson Information Booklet

AMMONIA is a gas consisting of about 82% nitrogen and 18% hydrogen. "Anhydrous" simply means to be free of water. Anhydrous ammonia is manufactured by combining nitrogen from the air with hydrogen and compressing the combined product to a liquid. It is the *most concentrated nitrogen fertilizer known* and an excellent source of nitrogen for practically all crops and types of soils.

Why is it the Lowest Cost Source of Nitrogen?

Anhydrous ammonia is the first product from which most of the other nitrogen fertilizer materials are made. As a primary product, anhydrous ammonia does not require the additional plant equipment and processing which go along with the nitrogen fertilizers made from it. It *costs less per pound of nitrogen to produce.*

Concentration Makes the Difference!

1 Ton Nitrate of Soda ....329 lbs. Nitrogen.

1 Ton Sulphate of Ammonia .. 420 lbs. Nitrogen.

1 Ton Ammonium Nitrate (Fertilizer grade) .....660 lbs. Nitrogen.

1 Ton Urea Fertilizer .....880 lbs. Nitrogen.

1 *Ton ANHYDROUS AMMONIA .....1640 LBS. NITROGEN.*

How Does It Save Time and Labor?

Because it is *concentrated,* anhydrous ammonia fertilizes more soil with less weight. It flows under its own pressure from tank cars to storage tanks—to field tanks—to applicator tanks—and through the pipes on the applicator blades into the soil. Anhydrous ammonia is not corrosive, and, moving under its own pressure, it is regulated to an even rate of application.

How Should Anhydrous Ammonia Be Applied?

Many types of applicators are used successfully in applying anhydrous ammonia to soils. They all have a pressure tank, applica-

tor blades which move through the soil at adjustable depths (usually 4 to 6 inches), and tubing connecting the tank with the distributing points. Control of the rate of application is obtained through metering devices.

What Happens to the Soil?

As the pressure is released in the soil behind the applicator blades, the compressed liquid ammonia expands to a gas and is absorbed in the soil moisture. Almost instantly all of it combines with the clay particles in the soil to form ammonia—clay which is insoluble in water. So long as the ammonia remains combined with the clay it cannot be leached from the soil. Many crops, and particularly young plants, feed directly on this ammonia from the clay combination.

At soil temperatures above 60 degrees F, and more especially above 65 degree F. whenever the soil moisture is in the range between one-third and two-thirds of the water-holding capacity, the bacteria in the soil change ammonia to nitrate. Simply stated, this means the nitrogen is changed from a fixed or non-leachable form to a soluble or leachable form. It has been shown that most crops feed on both these forms of nitrogen and that both are readily available to plants under most soil conditions. Many young plants seem to prefer their nitrogen in the ammonia form.

When Should Anhydrous Ammonia Be Applied?

In many areas it is good practice to apply anhydrous ammonia whenever fields are workable, because conditions may not be right if application is delayed. Applications may be made whenever non-leguminous crop residues are plowed down or as much as two weeks before planting on bare soil.

A fall application assures a supply of nitrogen for any crop during the following spring. If wet weather persists in the spring, there is no worry about waiting for favorable soil conditions to apply nitrogen fertilizer—it is already there! Fall applications eliminate the work of handling nitrogen fertilizers in the spring when you are busy putting in crops.

Storing anhydrous ammonia in the soil where it is to be used is perfectly safe and free from loss if it is applied at the 4 to 6 inch depth after the soil has cooled down in the fall. At many locations this means anytime after October 15. Anhydrous ammonia stays in the soil in the non-leaching ammonia form all during the winter. It does not change over into the leachable nitrate form until spring, when growing plants will use it. Crops start growing much earlier in the spring when

nitrogen is already in the soil.

Anhydrous ammonia may be applied to soils in the fall prior to drilling wheat, on land that will be sowed to oats, on pastures, or on corn land after corn harvest. For wheat on heavy soils, anhydrous ammonia may be applied just ahead of the drill at fly-free time, at a later date, or as a top-dressing in the spring. Applications after wheat drilling should be made according to soil moisture and weather conditions. When wheat follows beans, anhydrous ammonia may be applied anytime after the bean crop is removed.

For oats, applications of anhydrous ammonia may be made prior to planting, or as a top-dressing earily in the spring.

On pastures, anhydrous ammonia may be applied anytime when weather and soil moisture conditions permit the applicator blades to move easily through the sod, and it is desired to stimulate new growth.

On corn land, anhydrous ammonia may be applied anytime after harvest for the next year's corn crop. Or, it may be applied at the time of plowing or when preparing the seed bed as a pre-plant application. A pre-plant application, or an early-side-dressing, usually produces more corn per pound of nitrogen. However, if the anhydrous ammonia has not been applied earlier, a side-dressing with anhydrous ammonia up to the time of tasseling will usually prove profitable.

On level land where fall plowing has proven a desirable practice, and the soil loss by erosion is negligible, application *prior* to fall plowing may be advantageous. There is no loss of nitrogen in turning the soil because the ammonia is completely combined with the clay particles in the soil in a non-volatile, non-leaching combination very soon after applying. Application *after* fall plowing also may be made, providing the tilth of the newly turned soil will permit.

How Much Should I Apply?

At high fertility levels, there is a trend toward equal amounts of nitrogen, phosphoric acid, and potash applied per acre; but on corn and certain other cash crops such as cotton, the best response often comes from even higher amounts of nitrogen. *For some crops up to two times as much nitrogen is being recommended.*

Nitrogen cannot play its full role unless other fertilizer elements like phosphorus, potash, calcium, sulphur, magnesium, boron, etc. are maintained in the soil in proper balance. For best results, nitrogen and other fertilizers should be used in *adequate quantities along with good farming practices.* You should apply fertilizers up to the level of your

farm management, because it doesn't pay to farm at fertility levels below your ability to organize and manage your farm operations.

Is Anhydrous Ammonia Dangerous?

No, not if you are reasonably careful. Bulls, machinery, gasoline, electricity, butane gas and almost everything used on the farm is potentially dangerous if carelessly handled. Experience has developed proper tanks and applicators for the safe and efficient handling of anhydrous ammonia.

Don't fear anhydrous ammonia—respect it. Heed carefully the man who tells you from his own experience how to handle it safely. The man who tries to scare you is not trying to help you.

If for any reason you prefer not to apply anhydrous ammounia yourself, a distributor or one of his custom applicators can usually be found to apply it for you economically.

Pole Construction More Popular

Pole construction has come into its own for farm buildings.

G. D. Kite, Virginia agricultural engineer, says new developments in building materials and modern designs have made pole buildings more practical and longer-lasting than ever before.

In pole construction, the poles form the framework of a building. No concrete footings or foundations are needed, and less bracing is required than in other types of construction.

Poles made of the soft, non-durable woods treated with wood preservative will last 30 to 50 years—which is long enough for the best use of a farm building. Many buildings become out-of-date in less time.

Pole construction, although less expensive than other types, is not suitable for all farm buildings. It is most adapted to the one-story building, but not for the two-story building where footings are required. Pole-type construction is not acceptable in buildings that must meet certain sanitary requirements, such as dairy barns, milking parlors, slaughter houses, and refrigerator buildings.

Advantages of pole construction include first low cost, easy and quick erection, less need for skilled labor, use of rough lumber, and convenient arrangement. For the simple, average type of farm building, the cost will vary from $1.00 to $1.50 per square foot of floor area when the farmer buys all materials and pays labor. It would be less, of course, when farm materials and labor are used.

Virginia Polytechnic Institute

VETERINARIAN'S NOTEBOOK NO. 16

NO FOOT, NO MILK!

. . no profit from cow or sheep if hoof troubles are neglected . . .

Condensed from Farmer & Stock Breeder

NO foot, no 'oss! That has been a saying for years and how true it is! But it is a saying which might be applied to other animals as well as the horse, for there are few conditions which can cause a loss of condition more quickly than a painful foot. Take foul-of-the-foot (hoof rot) in the cow, for instance. This starts as an infection with a germ which lives in the soil and the site of the infection is usually between the claws of the foot.

It is more common in wet, muddy weather, and we have found it to be far more common on those farms where the cows have to plough through a sea of mud to get to the cowshed from October to May.

Lameness

The cow may go suddenly lame or the lameness may come on slowly over a few days. In either case there is great tenderness between the claws, and in many cases the loss of appetite, drop in milk yield and loss in general body condition can be quite alarming.

The region round the coronet swells up and, if left unattended. the animal will be unable to bear any weight at all on the affected foot after a few days. Then the swelling breaks and a foul smelling pus is discharged. At this the cow gets some relief, but unless something is done there remains a constantly discharging passage between the claws.

The risk of the bones of the foot and the lower legs becoming affected is quite large,and if this happens the cow becomes a case for major surgery and amputation of the affected claw.

In the past the treatment has been constant poulticing with hot bran or kaolin to bring the swelling to a head, and this has been

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Dorset House, Stamford Street, London, S. E. 1, England

followed by days of tedious syringing with antiseptic lotions. All this has meant many gallons of lost milk and the use of much valuable feedingstuffs to get back in condition.

Sulpha Drugs

Nowadays, thanks to a recent research, the rapid use of a large dose of one of the sulpha-group of drugs, given directly into the blood stream, has cut down treatment to a matter of days in many cases. When you next get a lame cow do not wait for four or five days to see if it will get better, especially if you suspect foul-of-foot. One of these injections, given by your veterinary surgeon, will save a lot of time and money.

There are some cases in which the injection does not give quite such a spectacular result, but in most cases it does, especially when given early.

Then there is foot rot in sheep. Again this is caused by a rather similar germ to the one which causes foul-of-foot in cattle. Foot rot starts as a mild irritation between the two digits. Later there is a break in the skin at the point where it joins the horn of the foot, and in the next ten days or so the foot becomes so thoroughly infected that the hard horn becomes separated from the underlying tissues, the affected sheep are crippled and the loss of condition is rapid and appalling.

If left too long slaughter is the only course. Usually more than one foot is affected, and you will not forget the dreadful smell in a hurry. This condition is highly infectious, and will spread rapidly through the flock, causing a heavy loss of condition.

The only thing to do is to isolate all badly infected cases and have them treated at once by your vet. The rest of the flock should be driven through bath of 5 per cent to ten per cent copper sulphate and placed on clean land. They should be put through the foot bath at weekly intervals until no fresh cases have developed for a period of three weeks.

Short Life

The germ itself will not live in soil for longer than fourteen days, and so it is safe to put sheep on pasture which has not borne sheep for the past fortnight.

One of the most painful foot conditions of all is laminitis, or fever-on-the-feet. It occurs in all animals, but perhaps more commonly in the horse, and comes on following too heavy feeding during a period of rest. It is seen in the horse which has been helping itself all day in the cornfield and in the mare which holds on to her cleansing.

The poor creature seems to be rooted to the spot. The feet are hot and tender, and if it is forced to move, the horse creeps along

like a cat on hot bricks. The animal sweats with pain, and unless professional help is called at once it might be left a cripple for life.

Until your vet arrives, hose the feet continually with cold water and ring up the blacksmith to come and take the shoes off. Put a rug on to prevent chilling and let the horse drink as much as it will. This is a serious condition, and unless cured quickly will render the animal more or less useless with deformed feet.

Due to Neglect

The foot of the horse is the site of three other nasty conditions: picked up nail, canker and thrush. The first one is usually due to accident, but the other two are due to neglect. In any case of lameness in the horse, always make sure it is not a picked-up nail or the presence of pus in the foot which is causing the trouble before you start rubbing liniment in somewhere. Quite a few clever chaps have been caught out like this.

Thrush and canker are found in those horses whose feet are never picked out after work, or in those animals that stand in a pool of water in a damp ill-constructed stables. Thrush is an infection down the side of the frog, and canker is when the entire sole becomes under-run with the infection. They are serious and can lead to the loss of weeks of valuable work.

Good and regular shoeing and constant attention to the foot of the horse always pay handsomely in the long run.

Pork Sausage Making Easy

Know the best way to make your own pork sausage?

Lyman Bratzler, a Michigan State College meats specialist, offers this advice:

Use three-fourths lean meat to one-fourth fat. Cut the trimmings into one-inch cubes, then weigh the results. For each 25 pounds add these ingredients:

Nine tablespoons of salt, 4 tablespoons of black pepper, 2 tablespoons of ground sage and 1 tablespoon of ground nutmeg, or cloves or any of the spice your family likes. But mix it well with the one-inch cubes of pork trimmings.

Then you're ready to put the seasoned meat through the grinder.

Don't hold the sausage over four to six weeks in the frozen food locker, Bratzler advises. The salt makes sausage rancid after that long.

Michigan Extension

How We Water Vegetable Crops at Seabrook

On this 2500 acre vegetable farm irrigation plays an important part in the production of high quality vegetables . . .

Condensed from New Jersey Farm and Garden

Donald G. McAllister as told to *William A. Haffert, Jr.*

SEABROOK FARMS, Bridgeton, New Jersey, was one of the first in the country to use irrigation. We still have 150 acres under the original Skinner type overhead pipe, but are using portable equipment on the other 2,350 acres we water. Fixed pipe is too hard to work around and under, and it isn't flexible enough to suit our strip farming, rotation practices, and large harvesting equipment.

We are fortunate in regard to water supply and use three sources, deep well, pond and stream. It takes about 60 gallons for one application. Our deep well turbine pumps have a capacity of 200 to 1,250 gallons per minute and our portable units from 300 to 1,500 gpm. These are diesel and/or gasoline powered.

Our mains from pump to field are from 100 to 2,500 feet long and vary in size from 4 inches to 12 inches in diameter. The header pipe from the main to the lateral is 4 to 8-inch pipe depending on distance and volume. Lateral lines are from 4 to 6-inch pipe. On long lines we start with 5 or 6-inch pipe and reduce to 4 inch on the last half of the line. This reduces friction loss and maintains an even pressure on all sprinklers in the line.

We have some fixed underground mains, but are getting away from them, because they are not flexible enough. There is too much shifting of acreage to make it profitable.

All our pipe, either stainless steel or aluminum, is in 20-foot lengths, and we use small sprinklers 40 feet apart on the laterals. With risers they are about two feet above ground. Laterals are spaced 40 feet apart, too. Some

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say you can go to 50 of 60 feet, but we have experienced dry spots irrigating that way. A stiff breeze will destroy completely coverage if you space your laterals widely.

We used giant sprinklers after the war, because the small ones were hard to get. They gave us too much soil compaction and washouts on small-seeded crops. The larger the sprinkler, too, the more difficult it was to get coverage.

We irrigate snap beans, beets, carrots, spinach, broccoli, kale, cauliflower, rhubarb and a little sweet corn. Our acreage consists of different phases of Sassafras sandy loam, with a wide variation of soil types within a reasonably small area.

The difference in soils, and in crops, affects the amount and frequency of water application. I suppose most farmers want to know: "How much and when?" Let's examine rate first:

Since I have been here we have reduced the rate of application by about half. On most light sandy soils, I would say that an acre inch of water per application would be the very top limit. On heavier loam, carrying some clay, the crop should get as little as one-third inch per hour. For economical reasons, however, we apply about a half to three-quarters inch per acre an hour. Here's why:

If you have a given area to cover in a certain time, you need so much pipe. Time is the limiting factor. Therefore, if you cut the rate of application in half, for example, you'll need twice as much pipe to cover all the ground within the watering cycle you have established. Ours is six days in hot, dry weather. Even with ideal rainfall, in the Bridgeton area, we often use an extra inch of water every five or six days.

We don't always apply an acre inch of water per application. It varies with soil and weather conditions. If you start to get run-off, it is time to stop. Rate and timing also depend on the crop.

For instance, we were running some careful checks on some strip farming, using the same rate of application side by side on snap beans and on sweet corn. A measuring device we had experimented with—called an evapotranspirometer — indicated we needed to apply ¾ of an inch . . and we did. But field observation showed that while the snap beans had dried just enough to do a respectable job of cultivation, the corn was suffering from lack of moisture.

We haven't found any really practical mechanical means of measuring soil moisture needs. The "evapo" was found deficient in that it didn't allow for

size or variety of crop, and you can't keep the same water table in the field that artificially you maintain in an "evapo." I imagine in mid-July our water table might be 12 or 15 feet down. Even then the water table might vary.

Plaster of paris blocks are another device which, when buried, set up a resistance between two wires at either end in direct proportion to rate of absorption of moisture. But, again, varying soil type and temperature seem to affect these blocks differently.

You might say this had some bearing on the timing of an application of water rather than rate, but they are inter-related.

For instance, a particular crop may be standing still, or even slipping, because of a lack of water, while weeds right next to it will thrive. There must, then, be a variation between crops in their water requirements. We are hoping to get more accurate data as to tolerances.

Like everyone else, we have a tendency to hold off irrigation when we see thunderheads or overcast weather. We know we shouldn't, but we do . . . and we're trying to get away from it. Maybe more detailed forecasting will supply the answer. We get twice-a-day forecasts from the Atlantic City weather bureau and we have our own weather forecaster at Seabrook. Now we're going to try to pinpoint that general South Jersey forecast to our own local area. We are installing direct teletype service to the weather bureau and will enlist more aid from the 100-odd forecasters in the South Jersey area who cooperate with the weather bureau and us.

We usually irrigate until there is no more absorption without run-off. Remember we are applying our water faster than we would under ideal conditions, so that the soil actually is not water-logged. Therefore, if it does rain, the crop can still take it . . . unless it is a gully washer . . . and then, what can anyone do?

For day-in, day-out management, our timing is related to a six-day work-week on the 2,500 acres under irrigation. We try to lay out our laterals in units of four. While two are operating, the third is draining for a half hour and the fourth is being moved 40 feet. Of course, this system can be worked in multiples of four, too. We use two to eight men to a system, depending upon size of field, length of laterals, etc.

Here's a rule of thumb I would suggest to those who are thinking about it: For example, if you have 24 acres of sweet corn, you will need to get over it probably once in six days. This

means you must cover four acres a day with an inch of water per acre. Enough irrigation to do one acre at a time means you will have to shift the pipe four times a day. I would say this would pretty well fill one man's time. But even that practice might not be profitable unless you could diversify your crops. If you grow crops that have different water needs at different times, you can make the same system do much more work. It's pretty expensive to buy and operate a system for a single harvest, except in especially high income crops.

We invest from $100 to $150 an acre in equipment, including pump, mains, laterals and sprinklers. We estimate it costs $5 to apply water an inch deep to cover an acre, but this includes paying off the cost of the pipe, pump and water source and building a reserve fund for replacement. We think irrigation definitely pays, if well managed so as not to abuse soil and crops, and that more and more of it will be used.

Management Practices

SUB-SOILING—We do some of this, especially in low spots, chiseling 15 to 18 inches. We ought to do more of it because it aids drainage on some of our soils and gives better aeration, especially with present-day heavy equipment adding to compaction problems.

Weed Control — Although we try to destroy germination as much as possible in preparing the seed bed, we are getting into heavier use of chemical weed killers. The old stand-by, Stoddard's solvent, is standard practice on carrots. It seems to have a tolerance—too much won't harm, and a little less seems to do a fair job.

We have been using Sinox W, Sinox PE, CMU, Chloro IPC and Crag herbicides, depending upon the crop. There are hundreds of them, and we'll get more and more specific in what and how we use them as time goes on. But an important point is this: Most of these chemicals work better in moist soil, so irrigation already has proved beneficial in this regard.

Soil Conditioners — We have tried some soil conditioners, but the cost for a complete application would run somewhere between $200 and $400 an acre. Even if banded just over the row, the cost might be $50 or more. This price will come down, and some day I hope will make them practical to use. They certainly have some benefits, especially in counteracting soil compaction from rain and irrigation water. Perhaps their greatest use will be in speeding seedling emergence, especially on small-seeded crops.

Fertilizer and Spray — Although there may be some slight loss of fertilizer—especially nitrogen—when you use irrigation, we use the same rates of application on irrigated and dry acreage. It is standard practice now at Seabrook to "feed the crop that feeds the crop." We fertilize the cover crop before turning it under. In most cases, this has worked as well as direct applications of fertilizer to the growing crop. We run weekly tests on nitrogen on most crops, and apply as needed. Perhaps it runs a little higher on irrigated crops due to leaching and increased crop growth. One reason we don't use nutrients through irrigation line is that nitrogen is generally lowest after a rain—when irrigation is not needed.

Irrigation calls for definite coordination in cultivation and application of insecticides, too. We often use a plane to apply bug killers, because it is fast and only a trifle more expensive than ground application. Here, again, timing is so important we think it is worthwhile, and of course you can spray or dust a field right after irrigation. The stuff seems to stick better to wet foliage, too.

Our system is based, of course, on large acreage and an exacting harvest schedule, so we can keep the labor supply and other details as uniform as possible at the processing end. But certain fundamentals, based on long experience, apply to the smallest irrigation project.

Get your system *properly engineered!* Try to work out that four-lateral principle, so your ground has a chance to settle and won't be tracked up so much when wading in mud to pick up your empty lines. Remember friction loss, and use pump and pipe of *adequate capacity.* Make sure your water supply is ample, 30,000 gallons for an acre inch. Pick your sprinkler nozzle and orifice to *suit the soil* so there won't be undue compaction and run-off.

Arrange a system of *crop rotation* that will keep your soil in good physical, water-holding condition. Arrange crops to get *maximum use.* It is cheaper to cover several crops at several times, on small acreage, than one crop all at one time—and have only once-a-year use of your system.

Finally, give it *good management.* We have found you can train men to do a good job if you stick with them long enough to make sure they understand the why and how of your system of operation. Also, fit the system to YOUR needs. I know of no other farm practice that varies so much with individual conditions as irrigation does!

WATER—The Life Blood of Agriculture

Any program to increase per acre yields of crops in the future must include irrigation. . .

Condensed from The Southern Planter

Dr. H. N. Young,

Director, Virginia Agricultural Experiment Station

WATER is our most important mineral resource. No living thing, plant or animal, may exist without it.

Water is a necessary ingredient in the manufacture of numerous industrial products such as steel, paper, aluminum, oil, cotton cloth, rayon, and a multitude of articles in common every day use. It supplies the power to generate much of our electric current and to turn a large part of the wheels of industry. Water has, also, many recreational uses such as swimming, boating and fishing.

Demand for Water Increasing

In the United States our population is increasing at the rate of about two and one-half million persons a year. Nearly everyone has more of the necessities and conveniences of life than did his parents a generation or less ago. The result has been a vast increase in the production of food and fiber, and the numerous industrial products which contribute to our constantly rising level of living.

To support and maintain our rapidly expanding economy there is required an ever increasing quantity of water. According to a recent estimate of the United States Geological Survey the demand for water by industry alone will increase 170 per cent by 1975!

In the humid East, there has been, with a few exceptions, enough water on our farms to care for the needs of the farm home and to water the poultry and livestock. The situation

Reprinted by permission from The Southern Planter, Richmond, Va., December 1954

with respect to crops is entirely different. About 10,000 gallons of water are required to grow a bushel of corn and 7,000 gallons to produce a bushel of oats. More than 200,000 gallons of water are required to grow one ton of cured alfalfa hay.

The demand of growing crops for water is highly seasonal. In the case of an acre of corn having a potential yield of 75 bushels, 4.2 inches of water or 23 per cent of the total corn crop needs is required in July at Blacksburg, Virginia. This is more than the July rainfall, including the surface run-off, in 23 of the last 57 years.

Stated another way, there would **not** have been enough water available at critical times to grow a 75-bushel corn crop during 40 per cent of the last 57 years even if all the rain which fell had been absorbed by the soil. Inasmuch as a considerable part of our July rainfall is of the thundershower variety, it must be assumed that a large part of it is dissipated as surface run-off.

Under the circumstances, it would seem safe to estimate that a shortage of water in July will limit the corn crop at Blacksburg to a yield of less than 75 bushels per acre at least half of the time regardless of the quality of the seed or the kind and amount of fertilizer applied.

Only three times within the last 57 years has there been insufficient rainfall in July at Blacksburg to meet the requirements of a 25-bushel per acre corn crop. A generation ago, when corn yields in Virginia averaged about 25 bushels per acre, a shortage of water for growing crops was infrequent and not usually a serious problem.

Crop yields have been increasing at the average rate of about 2 per cent a year during the last 30 years. The rate of increase would have been more rapid if there had always been sufficient water to go along with the better seed, larger amounts of fertilizer, and improved cultural practices. Largely because of the increased per acre yields which are the results of applying the discoveries of science and education, it may be expected that summer droughts will be about three times as frequent as they would be at 1925-1930 crop yield levels.

If this estimate is approximately correct and if the same level of precipitation continues as has prevailed over the last 57 years, there will be insufficient rain in two years out of five to supply the water necessary to maintain the level of crop yields which our soils are capable of producing with farming practices now being used by good farmers.

At present, about 25 million

acres of farm land are being irrigated in the 17 western states. Less than 100 years ago that part of our country was known as the Great American Desert. Its fertile valleys which have been supplied with water are a living testimonial to the fact that irrigation has made the West.

Irrigation Is the Answer

It is our judgment that if we are to continue to increase our crop yields and further develop the possibilities of our soils, we shall need to make a significant start very soon in the development of a system of irrigation adapted to our conditions and needs. If we continue to fail to supply our crops with the water which they need we shall weaken our competitive position in agriculture and seriously retard the further development of our farm resources.

The first step in making water available to our crops during dry weather is the development of a sound and comprehensive legal code which will encourage the maximum beneficial use of water. Under the Riparian Doctrine which prevails in the East, any property owner whose land touches a flowing stream has the right to reasonable use of the water including its use for domestic purposes and the watering of livestock. He is obligated, however, to pass on the water in the stream to his neighbor below substantially unimpaired in quantity and quality. In this case a precise definition of what constitutes "reasonable use" and what is meant by "substantially unimpaired" are matters for a jury or the courts to decide.

Under the Riparian Doctrine an owner of property not touching a stream has no legal right to use the water from it. Furthermore, those who wish to obtain water are not permitted to divert it from a stream in one watershed and discharge it in another without special legislation.

The Riparian Doctrine now in force in the humid East is unduly restrictive in nature and is poorly adapted to the needs of a modern and expanding economy. It imposes, in our judgment, a serious brake on economic progress not only on the farm, but in commerce and industry as well. We believe the Riparian Doctrine to be fundamentally unsound under present conditions for the following reasons:

1. It prevents maximum beneficial use of water from flowing streams, and it encourages waste. Under our present legal structure most of the water in our streams flows into the ocean because each property owner is legally obligated to pass on to his neighbor below the water in the stream which touches his property substantially unimpaired in quantity.

2. The fact that the owners of property not touching a stream have no legal right to the use of water from flowing streams places these individuals at a distinct economic disadvantage in the use and development of their properties. Furthermore, it makes such properties less desirable as home sites when compared with parcels of land touching a stream.

3. Since the Riparian Doctrine discourages the maximum beneficial use of stream water, it limits crop yields on the best soils and it often prevents farmers from putting their most fertile fields to their most productive uses. If the Riparian Doctrine were still in effect in the 17 western states most of the fertile valleys which are now irrigated would have remained as cattle range rather than become the producers of a large part of the nation's fruit, vegetable and nut crops.

4. Within the last decade there has been a phenomenal increase in the demand for water. As a result, new investments are being made in the development and use of water from our streams often with little or no assurance that the investor will have a legal right to a source of water supply when he wants it, where he wants it, and in quantities which he needs. One who plans to use water from a flowing stream to irrigate crops should first ascertain whether or not he may be inviting litigation from individuals downstream before making a costly investment.

5. In the absence of a clearly defined water code it is natural for many persons to assume that they possess unlimited right to the use of water from flowing streams or lakes. This attitude of assuming legal rights which are non-existent is often a source of litigation and other forms of irritation.

In the humid East a new water code is needed which will (1) encourage the maximum beneficial use of water and prevent waste; (2) encourage agricultural resource development in line with the basic capabilities of the land; (3) make secure the investment of water users; (4) clarify legal rights to the use of water; (5) protect the quality of the water supply; (6) bring about a reduction in the destructive forces of water; and (7) provide an effective administration means for guiding people in the proper use of water.

In view of the rapid rate of expansion of our economy, we seem confronted with the fact there will not be enough water for all during years of normal rainfall unless provision is made for the maximum beneficial use of this important resource and the prevention of water waste.

How To Understand Disinfectants

Here is helpful information about disinfectants and their use on the farm . . .

Condensed from American Agriculturist

ALTHOUGH they depend on various principles for effectiveness, different kinds of chemical solutions are considered the most practical germ killers for farm use.

The coal tar disinfectants act through coagulation and complicated chemical reactions. Chlorine combines with bacterial protoplasm to form entirely new compounds. Lye is effective because it has a caustic or corrosive action on most types of organic material.

Although chemical disinfectants are like hot air and steam because they require direct contact with bacteria to kill them, such contact may not occur in a routine disinfection job.

Surface tension that we used to illustrate by floating a needle on water is probably the most important. Being present everywhere in nature, this acts as an elastic membrane which serves to protect bacterial cells. Accordingly, it is necessary to lower or destroy surface tension before a good job of disinfection can be done.

The coal tar disinfectants may make the situation even worse by coagulating organic material around organisms so they can't be touched by the solution.

Even water has a fairly high surface tension which can diminish the effectiveness of a disinfectant solution. For this reason it is often advisable to combine disinfectant solutions with soap or some kind of a detergent which will act as a "wetting agent" by means of lowering the surface tension.

Then it must be remembered that the same disinfectant may vary in effectiveness according to the premises where it is used and the type of bacteria that is involved. Practically all disinfectants will work better on clean floors than on dirty ones.

Lye can be taken as an illustration of how effectiveness depends on the particular type of bacteria involved. This chemical will destroy practically all other types of disease organisms, but it is completely ineffective against the germs of tuberculosis which are covered by a coating of wax. Regardless of the disinfectant used and where it is used,

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though, three factors will determine its effectiveness.

1. As a general rule, the stronger a disinfectant solution is, the faster and more efficient its action will be.

2. Ordinary disinfectants don't act instantly, so time must be allowed for contact and destructive action.

3. Temperature of solution and premises must be considered. Most chemical actions are speeded up by higher temperature.

When these factors are recognized, owners can often do a better job of disinfecting by making helpful changes in regular procedure. If the solution and weather is cold, the time of exposure and the strength of the disinfectant can be increased. If there is little time available for disinfection, the solution can be applied hot and stronger than usual. If the solution is made up extra strong, it will act quickly when applied under cold conditions.

The following recommendations from the USDA can be safely followed for various diseases.

For *brucellosis (Bang's disease), shipping fever, swine erysipelas, tuberculosis.* Use 1 cup of USDA approved (stamped on can) cresylic disinfectant mixed with each 2 gallons of water to make a 4 per cent solution.

For *anthrax and blackleg.* Use five 13½ ounce cans of lye mixed with each 10 gallons of water to make a 5 per cent solution. For truckbeds, let the solution remain in the vehicle for 8 hours, then wash out with water before using again.

For *vesicular exanthema.* Use one 13½ ounce can of lye mixed with each five gallons of water to make a 2 per cent solution.

Heifers Aided By Oxytocin

What can you do about those dairy heifers that seem stubborn about letting their milk down?

Have your veterinarian give them a dose of oxytocin at milking time, suggests Dr. A. R. Drury, Michigan State College.

The drug is a synthetic version of a hormone normally secreted by the pituitary gland. It goes to work immediately after not more than a couple of injections.

Then, Drury claims, the heifer lets down her milk rapidly and continues to do so, usually without further treatment.

A heifer that doesn't let her milk down usually is not stubborn at all, Drury says. Her system just needs to be brought back into adjustment after calving. And a shot or two of oxytocin will do the job.

Michigan State College

Cut Milk Costs in Half

Some Michigan Farmers are producing milk at $1.35 per hundred . . . Here's how they do it . . .

Condensed from Hoard's Dairyman

C. R. Hoaglund, Agricultural Economist

IT COST some Michigan dairymen almost twice as much to produce 100 pounds of milk as it cost others. The higher feed costs were generally associated with poor roughage and heavy grain feeding. The best dairymen in a recent study fed as little as 1 ton of grain to produce 10,000 to 12,000 pounds of milk. Other dairymen fed up to 2½ tons of grain for the same amount.

To get this milk production with so little grain, you need top quality roughage.

The first step in producing good roughage is getting good stands. John Davis, an Eaton County, Michigan dairyman, has been successful in establishing good alfalfa and brome-grass seedings. He reports not a single seeding failure in 20 years! Davis not only establishes good stands, but manages them so well they are highly productive for 3 or 4 years.

John Davis uses a rather unusual rotation of corn-corn-corn —summer fallow and new seeding — meadow-meadow-meadow is fallowed on 130 acres of the best land. The second-year corn is harvested early for silage, then seeded to rye for winter cover crop. Thirty acres of the more rolling land is left in meadows as long as they are productive. It is then plowed and reseeded. Oats, a low-value crop, has been grown only twice in the last 20 years.

These are the steps followed in 1954 in making a new seeding:

1. April 12 — soil tested for lime, showed ph of 6.3 (slightly acid).

2. May 11 — started plowing corn stalks.

3. May 25 — cultipacked with drag behind.

4. June 9 and 26 — spring-toothed.

5. June 29 and 30 — applied 1 2/3 tons lime per acre.

6. July 1 and 30 — spring-toothed.

Reprinted by permission from Hoard's Dairyman, Fort Atkinson, Wisconsin

7. August 10 — cultipacked with drag behind.

8. August 12 — seeded 10 pounds alfalfa, 5 pounds brome grass, ½ bushel of oats per acre. Five hundred pounds of 5-20-20 applied per acre with drill.

Extra Costs Profitable . . .

Davis has experienced better stands with August seedings than in the spring. Later seeding does permit better weed control. Davis suggests that farmers troubled with quack grass will find this method of seeding much superior to the more conventional method with a spring planted nurse crop.

It cost Davis about $21 more per acre to establish seedings than it does the average Michigan farmer. Extra fertilizer, lime, and summer fallow tillage operations account for most of this additional cost.

Yields and costs in producing alfalfa-brome hay

Item	Davis farm	Average S. Mich. farms
Tons per acre	3.8	2.0
Total cost	$33.46	$12.70
Annual acre cost		
Establish'g (3 yr.)	$11.15	$ 4.23
Top dressing	5.10	2.27
Harvesting	22.00	18.00
Land charge	13.30	10.00
Total per acre	$51.55	$34.50
Cost per ton	$13.56	$17.25

Are these extra costs justified? A comparison of yields and costs per ton shows his system makes money. Hay yields have averaged 3.8 tons per acre the last two years—almost double the area average.

The really important cost figure is the one on a per ton basis. Although Davis spends $51, or $17 more than the average on a yearly basis to produce an acre of hay, he has a cost advantage of $3.70 per ton. But this is only one of the advantages of using fertilizer and lime liberally.

Higher yields make it possible to carry more livestock. He has feed enough for a 30-cow Holstein herd plus a number of heifers. He also is assured of good seedings year after year, so there is little or no need to use emergency crops which are often expensive and unsatisfactory.

The three fields harvested for hay in 1954 ranged from 70 to 85 per cent alfalfa. Alfalfa matures slower than brome grass and timothy. Thus, it is possible for Davis to produce better roughage than dairymen with meadows high in brome grass and timothy, even if hay harvesting is delayed by unfavorable weather.

Davis feeds about 1 pound of farm grain to every 5 pounds of milk produced during the pasture period and 1 pound of grain to every 4 pounds of milk produced during the barn period. Protein supplement is fed only when the

quality of hay is low. A 13,000-pound milk production average on this medium rate of grain feeding is evidence of good hay at a cost of $1.36 per 100 pounds.

No Corn in this rotation . . .

Robert Shepard of Genesee County is another Michigan dairyman who produces milk at low cost. His feed cost in producing 100 pounds of milk has averaged $1.35 in recent years. His 18-cow Holstein herd has averaged about 12,000 pounds of milk annually. He produces enough feed for his dairy herd on 92 acres.

Shepard's roughage program differs markedly from that of Davis. His small acreage has greatly influenced his cropping program. He credits his low-cost milk production to:

1. A cropping program based largely on highly-fertilized, well-managed meadows.
2. Production and liberal feeding of high quality grass silage and hay.
3. Balancing the good alfalfa-brome-Ladino clover roughage with a limited amount of grain.

Shepard eliminated corn from the rotation about seven years ago so that he could produce more roughage for his expanding dairy herd. His present rotation is one year of grain and three years of meadow. The seeding mixture consists of 6 pounds alfalfa, 4 pounds red clover, 3 pounds brome grass, and ½ pound Ladino clover.

About 300 pounds of either 3-18-9 or 0-20-20 fertilizer have been applied with the grain at seeding time. Shepard expects to apply considerably more fertilizer per acre in the future. An additional 300 pounds of 0-20-20 fertilizer is applied as a top-dressing in the fall on second-year meadows.

He remodeled an old barn into a pen-system of housing in 1950. This system is particularly well adapted to feeding a lot of grass silage and hay. His cows consumed about 35 pounds of grass silage and 22 pounds of hay daily last year.

Farm grain was fed at the rate of 1 pound to 7 pounds milk produced during the pasture period. Shepard's cows receive all the hay they will eat when on pasture. During the barn period, the cows were fed grain at the rate of 1 pound to every 4 or 5 pounds milk produced. Shepard eliminated completely the feeding of protein supplement three years ago.

The fickleness of weather at haying time is a major contributor to poor hay. A dairyman may expect only 1 to 2 consecutive days of no rainfall the last half of June. This is the time of year when it normally requires 1½ to 2 days of clear weather

to field cure hay. A farmer who depends on the sun to cure his hay down to a safe 25 per cent or less moisture content is faced with either cutting it early and risking weather damage or waiting until July and harvesting mature hay.

Wilting time for grass silage is usually less than 3 or 4 hours. This is one reason why Shepard and many other dairymen are putting up more and more grass silage.

Some dairymen need to do some experimenting on their own to determine whether they are taking full advantage of their good roughage. This is what Kenneth Caskey, manager of Carlton Dean Farm in Livingston county has done. All of the alfalfa-brome meadows are now harvested as grass silage and barn-dried hay.

The shift from field curing to improved harvesting and storage was accompanied by a 350-protein reduction in protein supplement and a 200-pound reduction in grain fed per cow. During this 4-year period, milk production per cow was increased by 1,500 pounds.

Heavy grain feeding doesn't pay . . .

Thirty-three cows were included in a study of the effect of feeding high producing grains at low, medium and heavy rates on milk production, costs and returns. Roughage of high quality was produced on the six farms where the study was conducted.

The 11 cows fed grain at a low rate (1 pound to 5.7 pounds of milk) produced 11,200 pounds of milk and netted $310 above feed costs. The 11 cows fed grain at a medium rate (1 pound to 3.7 pounds of milk) produced about 400 pounds more milk, but netted $12 less returns above feed costs than the light grain fed cows.

The third group of 11 cows received grain at a heavy rate (1 pound to 2.7 pounds of milk). They produced about 600 pounds more milk but netted $34 less returns above feed costs than the light grain fed cows.

Prices used during the period of the study are quite comparable to present-day figures. They were: 3.5 test milk—$4 a hundred, grain—$2.20 a hundred, soybean meal—$4.75 a hundred, hay—$20 a ton, and silage—$8 a ton.

Each individual dairyman will need to use good judgment along with complete records of milk production and grain fed individual cows if he is to make the best use of his feed supply.

Exotic Fruits Challenge Old Favorites

At the Florida Experiment Station they are conducting research projects on the introduction and uses of new fruits

Condensed from Nation's Business

Helen Muir

EXPERIMENTS now being conducted in the United States will eventually result in stocking the refrigerators of the nation with such exotic and little known fruits as the litchi or the soursop.

People who may never visit the tropics will be consuming sliced mangoes as they now do peaches. Holiday punches will be spiced with carambola or monstera.

At the University of Miami's Tropical Food Research Center, ten miles south of the main campus at Coral Gables, Fla., experiments on a number of fruits are well past the research stage and are actually being offered commercially on the frozen food market. This is made possible through the university's policy of releasing products to commercial sources when the experimental phases of its investigations are ended. A small percentage of royalty is then returned to the institution for further research.

The pureed banana is one of the center's products. A recent best seller on the Miami frozen food market is a new drink called guajava. Smooth, pink and refreshing, this concentrate of guava and lime is a natural for party cocktails, both alcoholic and not.

Other tropical drinks will appear as work on them is completed.

Few Americans have ever tasted a tangy tropical fruit called the Barbados cherry. It has more vitamin C than any fruit tested thus far. By a judicious blending with citrus juices scientists have transformed the Barbados cherry into a palatable puree as well as a frozen concentrate, pale reddish in color. It is now ready for the market in both forms.

Many Americans recall the days when the orange appeared

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only on the Christmas tree or tucked in the toe of a yuletide stocking. Today the citrus fruits of California and Florida are the basis of industries involving hundreds of millions of dollars. The perfecting of frozen orange concentrate in the University of Florida laboratories less than a decade ago did much to accelerate orange growing as, with one sweep, the problem of waste from overripe fruits or a glutted market was removed.

The same story may be repeated in other tropical fruits, but there is no danger that citrus fruits will disappear.

At its experimental farm, the university considers the cultural problems of growing fruits in commercial amounts. The sapodilla, akee, tangelo and sapote come in for their share of attention.

Actually, the breeding and growing possibilities of these fruits is as yet unexplored. The apple reached its peak of acceptability after thousands of years of breeding and selection.

By comparing the composition of fruits raised in the temperate zone—the apple, peach, even the grape and prune—with those of the tropics it has been discovered that tropical fruits are richer in nutritive value. Most tropical fruits are on the tree from six to 12 months before maturing, compared to three to five months for those grown in the temperate zone. This allows for the building up of food material within the tissues. The higher sun intensity is still another factor in bringing up the food value.

The main factor in preventing any widespread marketing of most tropical fruits has always been the fact that they do not lend themselves to long-distance shipping. Enormous quantities lie wasted on the ground all through the Caribbean area. Aside from pineapple and citrus fruits, few tropicals have been preserved whole or as juices.

Freezing meets the requirements for shipping.

The university, acting as technician - farmer-distributor-teacher, receives an increasing number of Spanish-speaking students from the Caribbean and Latin America who come to study in food technology and go back to spread the techniques in their native lands.

The tropical fruit aspect of the research center makes it unique but the scientists deal in vegetables as well. Of the 92 school cafeterias in the area, 86 are being supplied with pre-packed vegetables formerly called "waste."

Recognizing the fact that it is trail-blazing, the center experimented with undersized ears of corn, packaging them as four-inch and again as three-inch por-

tions, the latter four to a package. Put on the Miami market the four-inch and even the six-inch cobs were turned down by the buying public in favor of four three-inch sections.

When this fact was digested, a machine was designed to snip and cut this size and to replace the human hands formerly required for the motions.

One of the exciting discoveries in the vegetable field is that dehydrated broccoli contains around ten per cent more protein than alfalfa.

A tropical spinach introduced from Java is being tested and is found to freeze well. Moreover, the product has been introduced to a critical segment of the consuming public—school children. They approved it by asking for more.

Avocado ice cream, not yet perfected although startingly good, may prove a boon to ice cream manufacturers as a butterfat substitute for mass production. Purees of enticing tropical fruits to top ice cream sundaes are definitely in the future.

Like the concentrates they are already neatly packaged in the center's laboratory, standing in rows for visiting tasters.

High on the list of popular items to be tasted at the laboratory are tropical wines. Long ago, before the railroad reached Miami, settlers made pineapple wine, mango wine, and grapefruit wine.

Today the university is taking up the work and from "waste products" is turning out highly acceptable guava wine, with a dash of elderberry for color.

Surgery Best Way To Castrate Calves

There are many pros and cons about the best way to castrate calves.

The way Dr. S. L. Dalison, veterinarian at Virginia Polytechnic Institute sees it, surgery is the best and surest method. His rules are: Be clean, allow for drainage by carrying the incision to the bottom of the scrotum, and use a mild disinfectant after the job is done.

Those who favor the emasculatome may find it doesn't do the job in many cases. And failure often does not become apparent until the animal is ready for sale.

As for the elastrator—it leaves an open wound for two to four weeks, and that's asking for tetanus and other infections. Furthermore, the rubber can lose its elasticity, failing to do the job and causing possibly inflammations.

The Modern Beef Steer

What is the modern beef steer like . . .?

Condensed from Polled Hereford World

Professor J. H. Knox

IN a short period of years we will be called on to supply beef for 200 million consumers from about the same area we are using now. The alternatives are not pleasant. We either lose our market to more efficient forms of meat production or to foreign competition.

I think there are few of us who believe our cattle will produce more for the feed consumed than those of 30 years ago. We have depended on improved crop production and better feeding and disease control to increase beef production. Doubtless we will have more of these but it does not remove the cattlemen's responsibility to breed more productive cattle.

Our cattle now produce more for the feed consumed than 30 years ago. We will produce even better feeds and methods, but we still have a responsibility to breed more productive cattle.

Our failure to accomplish anything worthwhile along the production line is partly due to neglect of essentials while we have been preoccupied with things of little importance. Vigor, virility, longevity, and soundness are things the West is crying for. Yet we let them go by unnoticed while we clamor for things which have little more intrinsic value than a fashion display in a show window. It has been said that cattle breeding is an art for which perfection of form is the final goal. The efforts which have been made to produce beauty and perfection could have produced a lot of beef.

We have been laboring with many misconceived ideas such as the relationship between small size and true quality. We hear much of the big rough cattle that may occur in breeding for greater production. It is true, they do and they are not a thing of beauty but they make beef and they are money in the bank. Nothing is

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said of the little no-accounts which occur as frequently and are of small value to anyone.

There is the conception that compactness in type is synonymous with early maturity. It is so used in some of our text books. Early maturity in beef cattle means the ability to reach market form and finish at an early age or after a short feeding period. I am convinced that any association between compactness and early maturity is entirely coincidental. Some compact individuals or lines of breeding may possess this valuable characteristic but it is not because they are compact. I did not reach this conviction over night. It has been forced on me by 25 years of observation. We now have nearly 20 years of records to substantiate it and similar results have been obtained at other stations.

Little more can be said for the idea that compactness is essential for good carcass grades. I recently reviewed four series of experiments in which compact, medium, and large cattle were compared. Twenty-one lots of steers were reported on. In only one series, involving three lots, did carcass grade favor the compact type. The significance of this difference could be questioned for the compacts graded low good and the other two types high commercial. These are adjacent grades which in some cases may be divided by only a thin line. Likewise, there was no difference in dressing percentages in favor of any type.

In feed lot comparisons the larger type always makes greater gains. Actually this gives us no new information. If they did not gain faster, they would not be bigger. Most such comparisons have been made in two ways which have affected the conclusions drawn from them. The first of these is marketing at a fixed weight such as 900 pounds. In all such comparisons the larger type has shown a distinct advantage in efficiency.

The other plan is to market all the cattle after an equal time on feed. When the latter method is used the advantage in efficiency for the large type disappears. The reason for these differences is clear. All feeders know that cost of gain increases as cattle become older and fatter. If fed in the same way the small type cattle will be older and fatter at any given weight. If we can state it clearly we are close to the basic differences between types from the feeder's standpoint. With the usual methods of feeding and management large type cattle cannot be used to produce extreme top grades of ultra light carcasses. They pass the weight before they reach the required condition. Small type cattle cannot be used profitably to

produce heavy carcasses for they have passed the stage of high efficiency before they acquire the desired weight. The great majority of our beef comes well within these extremes.

I think it can be fairly said that the large type will have some advantage in producing any weight of carcass for which they can provide the required finish. Why? Because they will be younger when they reach the weight. The difference may not be as great as some would have you believe. Whatever the difference is, it is basic and something on which we can build the more important phases of an improvement program. In passing I might say we have found much greater advantage for the larger type on the range than in the feed lot. The advantage in cow production has been in the neighborhood of 20 per cent after allowing for the difference in amount of forage eaten. Apparently the matter of hardiness enters here.

In spite of all this the importance of type may have been overemphasized. We have all seen good producing cattle of all types, and poor ones too. Nothing is more inefficient than a 1,200 pound cow with a 300 pound calf except a cow with no calf at all. We have too many of both kinds. A breeder who selects an impractical type places a handicap on himself but he still has a chance to pick the best within his type. Here is where our greatest chance for progress lies.

There are several other commonly held ideas which have discouraged many from undertaking the simple procedures necessary for practical cattle improvement. One of these is that beef cattle are hard to improve because we can't study the carcass without slaughtering the animal. That is true but there is a whole group of productive factors which may be improved by simple means. Actually beef cattle have distinct advantages which make selection practical. Merit can be recognized in both sexes and at an early age. This makes the original selection of both bulls and heifers easy and progeny testing of sires effective. A beef bull can be selected on his own merit by the time he is 15 to 18 months old. His first calves, both male and female, make an effective progeny test when they are the same age. This may be a feed lot test or it may be records kept on the range. Compare this with the dairyman who has to wait until a bull's daughters have completed their first lactations at three years old before he has tangible proof of his worth.

Another thing which has discouraged many is the idea that the things we are talking about

are not very heritable. Many of our experiences appear to confirm this idea. We have all observed the effect which feed and care have on size and appearance of animals. Most of us have been disappointed in animals we have purchased. This is going about the thing in the hard way. When you are working with animals on your own farm which have had the same feed and care the differences you find are highly heritable. When we bring 50 yearling bulls off a New Mexico range where they have run together since weaning and compare their weight per day of age and their grade we are working with heritable differences. When 20 are selected you can be sure they are going to breed about as you would expect; some a little better, some not quite as good but the average just about where you would expect it to be.

Last winter a cattle feeder from Minnesota went to our experimental ranch with me when we weighed our yearling heifers. He was shocked at what he saw. I was too, a little. Drouth was severe and the heifers were 100 pounds lighter than in better years. This difference was not heritable but the nearly 200 pounds between the heifers themselves was and represents something very important on our ranges and in our feed lots.

This brings up another point. An idea is quite generally held that selection is effective only when animals are fed so as to bring out all their possibilities. It this were true the prospects for major cattle improvement would be dim. Most people who breed cattle are in no position to feed them out. Our work has shown that the same animals that do well on the range also do well in the feed lot. The things we call "rustling ability and hardiness" are pretty closely related to those you call "feeding capacity and good doing ability". From the standpoint of conformation we think we have observed excellent results from bulls selected in range condition. A bull that is thick when he is thin will be thicker when he is fat. It doesn't surprise me that he can be depended on to sire thick calves.

It is time we consider the requirements for achieving the needed improvement. Pick the best and breed to the best is now as it has always been, the road to progress. It is a matter of deciding what is the best. The first requirement is practical goals. Nothing worth while will result without them.

Another primary requirement is to select directly for the things we want, not something supposed to be associated with them. Haven't we been a little absurd on this point? Width of head,

shortness of cannon, softness of hide, and so on even to color of hair, when actually the only thing that is very closely associated with gain is gain itself. When we find yearling bulls or heifers on the range that have gained 100 pounds more than the average for the herd, we have something. We know they will produce well for us and provide steers that will gain well for you. If we want to raise heavy calves we pick heifers that are heavy at weaning, sired by bulls from heavy milking cows.

The third requirement is to make selections in conditions under which the animals are to be produced. Fortunately this is the simplest way. In fact most of the best ways are simplest. It takes an expert to read all the signs. Any of us can read the scales or even pick a profitable animal when we see it. When animals are selected under our conditions in the southwest on the actual ranch where they are to be used, the procedures are simple and inexpensive and we are sure we are making the best selections possible for those particular conditions.

These things seem very important to me. They mean the men who really breed cattle on farms or on ranches can produce the kind of steers we are talking about.

Describing this steer is not easy but there are a few things I am sure of. He will not be produced until we renew our confidence in the power of selection to improve the production as well as the beauty of animals. His mother will be a hardy, productive cow. Without that we will get nowhere. He will have the ability to grow fast and fatten quickly. He will have good conformation, too, and be just as much admired in his time as our most fashionable cattle are today. We will use different words to describe him. Words which mean less, such as short and compact, will be replaced by words like deeper, wider, thicker; words which mean more, more beef for the consumer and more money for the cattlemen.

Big Dividends in Small Garden Plot—That a home vegetable garden is worth the time, work, and investment in seeds and supplies was proved by Mrs. Homer D. Gray of Bath county, Kentucky. Her records show that despite last summer's drought, she made a profit of $95.15 on a garden plot 15 by 50 feet. She provided her family with these fresh vegetables: onions, radishes, lettuce, carrots, green beans, beets, corn, tomatoes, potatoes and rhubarb.

Cutting Corners in Chores

With labor both scarce and expensive, dairymen find they can eliminate much waste motion . . .

Prof. S. A. Engene, University of Minnesota

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are more efficient than others. What can we learn from them?

Our research work has shown that few farmers can copy their neighbors. Their conditions are different; they must make plans for their own farm. Of course, you can get many useful ideas from them. A systematic study of your own chorework, however, will be most useful.

There are three main places to look for possibilities to save work will be used. Some farmers throw hay from the mow to the mow floor, push it to the chute, then carry it to the manger. That is handling it three times. Others store the hay in a convenient place and let the cows eat it there —no handling.

Make a list of all materials you handle, and how many times you handle each. Start with one of them. Study it carefully to see if you can eliminate it. Then

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animals are selected under our conditions in the southwest on the actual ranch where they are to be used, the procedures are simple and inexpensive and we are sure we are making the best selections possible for those particular conditions.

These things seem very important to me. They mean the men who really breed cattle on farms or on ranches can produce the kind of steers we are talking

words which mean less, such as short and compact, will be replaced by words like deeper, wider, thicker; words which mean more, more beef for the consumer and more money for the cattlemen.

It all goes to show that farming is like any other business . . . .

You have to keep informed to succeed with it. That is why Farmer's Digest is so important to you . . . why you should read every issue. Only Farmer's Digest gives you so much usable information in palatable, easy-to-read form at so low a cost. In Farmer's Digest, you get the very best from more than sixty U. S. and foreign farm magazines.

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Cutting Corners in Chores

With labor both scarce and expensive, dairymen find they can eliminate much waste motion . . .

Prof. S. A. Engene, University of Minnesota

YOU can save a great deal of time on your chores. That is, if you are willing. Efficient chore work is planned, not bought.

Records kept by Minnesota farmers show an average of about 100 hours a year per cow for all chore work. This is for herds of 15 to 30 milk cows. Other dairy states show comparable figures.

The average is 100 hours, but some farmers spend only 75 hours, or less. Others spend 125 hours or more. These variations are for herds of the same size, and same production. Some men are more efficient than others. What can we learn from them?

Our research work has shown that few farmers can copy their neighbors. Their conditions are different; they must make plans for their own farm. Of course, you can get many useful ideas from them. A systematic study of your own chorework, however, will be most useful.

There are three main places to look for possibilities to save work —your barn, your equipment, and your work habits. Let us take them in that order.

Your Barn

Changes in your barn to save time will be mostly changes to save walking, so use the old wartime slogan—"Is this trip really necessary?" A few basic ideas will locate many chances to save walking.

Much of your travel is to move materials—hay, grain, bedding, manure.

Must we move that material? With better planning it might be possible to store it where it will be used. Some farmers throw hay from the mow to the mow floor, push it to the chute, then carry it to the manger. That is handling it three times. Others store the hay in a convenient place and let the cows eat it there —no handling.

Make a list of all materials you handle, and how many times you handle each. Start with one of them. Study it carefully to see if you can eliminate it. Then

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go on to the next. It will be slow, hard thinking, but it will give results.

If you cannot eliminate a trip, the next thing is to make it as short and easy as possible. Place your supplies and tools close to the place where you use them. Arrange gates and doors to give a direct line of travel; use the rule from geometry—a straight line is the shortest distance between two points. For example, to carry silage to his heifers one farmer walked from the silo room through the cow barn, around the silo and lean-to, and ended at the manger a few feet from the silo room. A little time with a hammer and saw opened a door directly from the silo room to the heifer barn.

Consider every possible change, no matter how small. Small savings accumulate surprisingly fast. Fourteen feet a day, or five steps, every day for a year adds up to a full mile.

To help study your travel, make a drawing of your barn, to scale. Mount this on a soft board. Follow a day's chores, using ordinary dressmaking thread to show every trip. Pins stuck into the board will hold the thread in place.

So far we have talked about improvements in your present barn. If you must build, it will be worth while to consider loose-housing. As an average, loose-housing probably will save 15-20 per cent of the chore time. That is enough to be worth considering. There are many other factors to consider, of course, so that many dairymen will decide on the conventional stall barn.

A good arrangement of a barn is more important than the type. A convenient stall barn will be more efficient than a poorly arranged loose-housing barn.

Even though labor is expensive, remodeling and building to get a more efficient barn must be done with care. The saving in labor must be balanced against the extra cost of the building. The main costs to consider are: depreciation, repair and upkeep, interest, taxes, and insurance. If possible, figure the costs for each investment.

As a rough approximation, annual cost of a dairy barn is about eight per cent of the original cost. That means that for every $1,000 you paid for the barn the cows must pay $80 a year in rent. If you invest this money to make the barn more efficient you either must save this much in other costs, or you must be willing to spend this much to save yourself the work.

Your Equipment

Good, well-chosen equipment helps to save time. Some equipment, as milking machines, gutter cleaners, and silage unloaders, actually take over the work from

the man. This is especially valuable for jobs that are highly repetitive or are heavy.

Since some of these machines are relatively expensive, using some machines for more than one purpose helps to spread the cost. For example, with careful planning portable grain elevators can be used to move grain from a bin to a wagon, or to move grain from a big bin to an overhead bin so that gravity will put the feed where you want it for feeding. The blower on a hammer mill can be used for moving feed around the farmstead or barn.

Carts and carriers will help a man do more—he can move more material on a trip. One farmer we worked with on our research spent 11 minutes a day and traveled 1,100 feet a day to feed his cows with a bushel and a half basket. A six-bushel cart on bicycle wheels cut this to six minutes and 600 feet. It cut the energy needed still more.

To take full advantage of carts plan their use to cut down on materials handling.

Plan a definite, convenient place to store a cart, otherwise it may interfere with other work.

Provide plenty of forks, shovels, and other small tools. Select the proper type for each job, and leave it at that job. That will save a lot of unnecessary walking.

With equipment as with buildings, figure the cost and compare it with the savings. Annual equipment costs will run close to 20 per cent of the initial cost. That is, the annual cost of a $100 machine will be close to $20; the cost of fuel or electricity will be in addition to this.

Your Working Habits

The value of a good barn arrangement and effective equipment can be offset by poor working habits. In fact, good working methods may be the most important of the three.

Many men are naturally more efficient than others. All of us, however, can improve ourselves by systematic study. The following steps have been helpful for others.

First, establish a definite plan for doing your chore work, and follow this plan as closely as possible every day. We have seen enough dairymen do this to know that it is possible.

With a definite, systematic plan you are more likely to do each job at the proper time, and avoid unnecessary trips back to jobs you overlooked.

Second, observe carefully and closely what you do now and how you do it. The more you know about your present methods the greater is the possibility for improvement. Many of the things we do are done so much from habit that we are not con-

scious of them; we do not recognize many of our wasted motions.

To help become conscious of these motions, make a written list. Write down step by step what you do for some job—you will be surprised at the length of the list.

Third, question all details of your job. It may help to get some neighbor to go over the list with you. Here are some of the questions you might ask yourself.

Is this job necessary? What do I gain by it? Could I eliminate it? Some of our tasks had a good reason; now that reason may be gone, but we continue from habit. You will find some jobs to eliminate; even if you cannot, the attempt to explain why you do the job will give ideas for improvements.

Is this the best place to do the job? For example, some farmers grind their feed in the granary, others in the hay loft, and still others with portable mills.

Is this the best time to do the job? Changing the order in which we do our work may cut out some travel.

Is this trip necessary? One of our farmers asked himself that when he went back to the granary to get more mash for his hens. His answer was: "No, I knew I was short of mash the last time I was in the house; if I had brought the mash pail then and set it by the granary door I could bring a full pail on the next trip to the hen house."

Is this the shortest, easiest, quickest way to make this trip? Do I find unnecessary gates, doors, or steps? Will rearranging the barn cut my travel?

Can I use some equipment to save time and effort? Will it save enough to pay for itself?

As with travel, small savings count up quickly. Saving one minute a day is 365 minutes, or six hours, a year. Saving five minutes a day is 30 hours, or about three working days each year. Many such savings have added up to saving one quarter or more of the chore time for farmers we have helped.

Fourth, put your ideas into practice. If possible, start using each idea as soon as you get it—why wait?

These ideas for studying your chore work seem slow and tedious, and they are; but, they give results. They help to lead to many surprising savings.

Records obtained from dairymen show that they have cut the time spent per cow from 135 hours a year to 100 hours within the last 15 years. How did they do it? Largely by eliminating unnecessary and unprofitable jobs and by streamlining work methods. They introduced some new equipment, but not enough to account for this big saving.

Sprinkler Corrosion Can Be Stopped

Extensive research has helped to solve the problem of sprinkler corrosion. . .

Condensed from The Utah Farmer

Robert L. Sincock

SPOTS inside a length of aluminum sprinkler irrigation pipe looked to an eastern Washington farmer something like barnacles. Holger Hansen, squinted through the pipe again. Daylight whirled back from the far end provided a better answer this time. Those marks were crust—and pits—in the aluminum itself!

When Hansen turned away from his field below Straford, Washington, that July day in 1950 and reported something had happened to his one-year-old sprinkler system, he had recognized the first actual case of corrosion in an aluminum sprinkler system. Since then, aluminum companies in many sections of the United States have had corrosion complaints —in California, Kansas, New Jersey, Pennsylvania, southern Idaho and Oregon, for example.

Farmers, dealers and manufacturers, naturally became alarmed. Aluminum pipe, which might be expected to last 10, 15 or more seasons, was being made useless in some cases in only a year. In extreme cases, pipe was destroyed within six months after installation.

The Washington State Institute of Technology, a part of Washington State college, was called in immediately. Since then, a team of investigators headed by Dr. Mark Adams, associate chemist in the division of industrial research, has clarified major questions about when and where corrosion may strike and what can be done about it. Farmers, dealers and aluminum makers Alcoa, Kaiser and Reynolds have worked closely with the college, which today is the only place where research is probing into the actual cause of aluminum pipe corrosion.

Reprinted by permission from The Utah Farmer, Salt Lake City, Utah, August 5, 1954

Here's what the institute reports: **There is no single cause.** Instead, several have been found thus far, and Dr. Adams anticipates that he soon may identify another. He says pipes can be damaged by any one of several chemical reactions, when coupled with the right temperature and certain other conditions.

As examples:

When exposed to oxygen in the air, pure aluminum immediately acquires a protective coating of aluminum oxide. Once this coating is disturbed and not replaced, the oxides are sparingly soluble in water but if the concentration of salts in the water fed into an aluminum sprinkler system is high, it tends to set up corrosion, and eventually may replace the aluminum oxide coating of the pipe. However, heavy metal content of waters investigated during WSC's search has been fairly uniform regardless of source and has been of questionable significance thus far.

Similarly, contact of a dissimilar metal with aluminum is another known cause of corrosion. Examples are iron bolts connecting parts of a sprinkler system, and copper and brass contacting aluminum in the valves. Most systems now are built to avoid contact of dissimilar metals.

And there were other points of checking; such as any variations in the surface of metal, where corrosion would occur if other factors permitted. The common practice of nesting smaller pipes inside larger ones for storage is another cause for corrosion because the pipe is easily abraded, damaging the oxide coating. Sand abrasion in water is not a serious cause.

During the four years of chasing the mysterious pipe-killer, only one factor has coordinated with corrosion. This is free dissolved carbon dioxide, a factor which doesn't show up in ordinary water tests and couldn't be detected when water samples were taken to the laboratory because once the water system was opened to draw off a sample the carbon dioxide disappeared. Carbon dioxide finally was found by setting up closed system measurement methods.

Although Adams has not yet determined "beyond a reasonable doubt" that this is the major cause of corrosion, he is confident now it will be the ultimate cause. To him, evidence points strongly to free dissolved carbon dioxide in the water as the destroyer of the aluminum oxide coating that otherwise would protect the pipe from corrosion.

But the technologists point out that **there's nothing wrong with aluminum pipe itself.** Because of its lightness and strength, and because of its re-

sistance to corrosion by many types of waters, aluminum is in general an excellent material for portable sprinkler systems. (Instead of pure aluminum, of course, an alloy that offers greater resistance to corrosion actually is used.)

Numerically, the known cases of pipe corrosion still might be called few and scattered, but more are being reported each season. The trouble is more general in certain districts than others.

But take note of this: More than 90 per cent of the troubles have occurred in sprinkler systems using well water. Not all well water, on the other hand has caused corrosion.

Equally significant is the fact that 95 per cent of the damage is confined to the main lines, with very little in the laterals. In particular, damage has occurred principally in main lines kept under pressure rather continuously. Dr. Adams says, however, that it's probable there are many as yet undiscovered cases of damage because virtually all corrosion takes place inside pipes.

So watch out for any signs of damage in your system.

Now—what can you do about it if you do have corrosion difficulties?

Adams and his research associates have worked out a practical solution which farmers having trouble can carry out themselves:

It's simply to paint the inside of the pipe, using certain paints. (R. M. Wade & Company, Portland, Oregon, firm, was the first dealer in the west to offer such commercial treatment on request, at a percentage of the system's cost.)

In making painting suggestions, one aluminum manufacturer has notified its irrigation distributors: "There are some types of waters and conditions of service where corrosion will occur. Where unusually severe or rapid corrosion is encountered or is expected, we suggest that a protective coating be applied to the interior of the pipe . . ."

This manufacturer suggests cleaning be started by using a phosphoric acid type cleaner, following the acid maker's directions. However, where farmers want to paint the pipe themselves, adequate protection can be given without use of the additional acid-cleaning step. Chemist Adams suggested this method:

- First, clean the interior of the pipe, using a rotary wire brush attached to a long rod mounted in the chuck of an electric drill. A centering guide would help. Do this from each end of the pipe for half the pipe's length. A rod about 20 feet long is needed for the 40-

foot lateral sections; mainline sections are 30 feet long.

● Follow this by wiping thoroughly with a clean cloth.

Don't use compressed air; grease and water particles might be blown into the pipe.

● Next comes painting. Two men can do the job. Plug one end, pour in one gallon of paint (for a 30-foot pipe), then plug the second end. Lay the pipe flat and roll it. Drain excess paint into a bucket. **Use thinner only as recommended by the paint maker.** Thinner may save paint, but not the far more expensive pipe.

Reflection of light through the pipe gives a simple check on completeness of the coating. Perfectly complete coverage is unnecessary if chromate-type paints or Zincilate (made by Industrial Metal Protectives, Inc., Dayton, Ohio) are used. That's because chromates and Zincilate (the latter is a zinc oxide pigment in a polyvinyl vehicle) are corrosion inhibitors themselves. Other paints are cheaper and also can do a good job simply by sealing off the aluminum walls from the water. They depend, therefore, on completeness of coverage.

At first, the user might think a gallon won't go far, but treatment even with Zincilate, which costs about $15 per gallon in the west, results in a protection cost of about 1 cent per foot per one-inch diameter if the farmer does the work himself. Thus, treatment of five-inch pipe costs 5 cents per foot, or about 75 cents per acre for mainline or $2 per acre for mainline and laterals.

These figures can be compared with replacement costs, which vary with type of layout, but they're probably somewhere around $15 per acre for the mainline pipe alone. That's $15 compared with protection cost of 75 cents or less, depending on paint used.

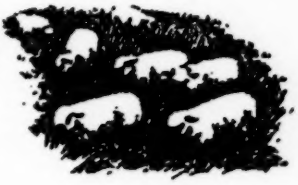
In conclusion, here's one further point to keep in mind: Sprinkler systems used only periodically have had trouble with corrosion, according to Dr. Adams. And significantly, there's no problem in wheel-type systems hooked to buried steel main lines, because wheel systems must be unhooked to change settings and the aluminum parts of the system thus drain themselves.

But even if draining a system once a week might positively check corrosion, this still wouldn't be practical for many arid land, interior farmers, Dr. Adams points out. **For this reason, keep in mind the treatment recommendations listed above.**

U.S. plant breeders still find many useful plants in other countries. For use in breeding improved cereal crops alone, nearly 12,000 plants have been introduced from abroad since 1948.

Self-feed Phenothiazine to Sheep

Phenothiazine fed with salt will give excellent control of many sheep parasites . . .



Condensed from the Nebraska Farmer

TWELVE years of testing has proved that phenothiazine, when mixed with salt and fed continuously on a free-choice basis, is safe and effective in controlling internal parasites in sheep on pasture.

This finding is particularly helpful to owners of farm flocks, since internal parasites cause their most serious losses.

As early as 1939 research men found that internal parasites in sheep could be controlled with dosages of phenothiazine. It is particularly effective in checking infestations of stomach worms, hookworms, small intestinal hair-like worms known as trichostrongyles, intestinal wireworms, and nodular worms.

Dosages of phenothiazine kill most of the worms and eggs—but not all. Within a matter of a few weeks when the sheep are on pasture, the few remaining worms can multiply into infestations of s e r i o u s proportions. Therefore, a safe, economical, and effective method is needed to prevent redevelopment of parasites in grazing sheep once the internal parasites are brought under control by medical doses.

Agricultural Research Service scientists began in 1942 to test the reactions of a flock of average sheep to a mixture of one part phenothiazine to nine parts loose granular salt fed on a free-choice basis. The mixture has been kept before the flock continuously except for a brief period when it was purposely removed. This is the longest period animals have ever been exposed to the drug.

Since the free-choice treatment was started at the Agricultural Research Center in 1942, lamb crops have improved steadily in quality and in the number born alive. The parasitic infestation of the flock, which was originally quite severe, declined under treatment and has been held in check.

The animals are nearly free

Reprinted by permission from the Nebraska Farmer, Lincoln, Nebraska

from nodular worms. Stomach worms, hookworms, trichostrongylids, and nematodirids are sometimes found in very small numbers. Even some of the other types of parasites originally present in sheep have also disappeared. It has not yet been proved whether or not phenothiazine was responsible for eradicating them from the flock.

No Immunity Develops

After five years of continuous use, the phenothiazine-salt mixture was deliberately removed for about 5½ months. During this period, parasite numbers multiplied rapidly and losses from parasites began to occur. At the end of the period without treatment, losses were stopped by administering full therapeutic doses of phenothiazine (medical doses to treat existing disease or parasitism), followed by a return to the phenothiazine-salt mixture as a preventative. During the 6½ years from that time to the present, parasites have again been controlled in the flock by this preventative method. It is evident from this research that sheep do not build up immunity to parasites as a result of the small infestations that persist despite the drug, nor do parasites seem to develop immunity to phenothiazine.

The chemical causes no ill effects upon breeding, fertility, lambing, lamb growth, wool production, and general condition of the flock. After sheep have consumed phenothiazine continuously, the wool becomes slightly rosy in color. Some sheep raisers have questioned this color change as a possible economic liability. However, tests have shown that after scouring it is very difficult to tell the wool of phenothiazine-treated sheep from that of non-treated sheep.

Method and Cost of Treatment

Before the free-choice treatment is started, the sheep should be given therapeutic doses of phenothiazine to rid them as much as possible of any parasitic infestations. No further therapeutic treatment should be necessary except for heavily parasitized animals that might require repeated dosing.

The phenothiazine-salt mixture should be put out the first day of the grazing season — before pastures become contaminated from droppings. It should be kept before the ewes and lambs at all times during the warm grazing season, generally from May to October and longer in the South. One part of phenothiazine is mixed with nine parts of loose granular salt. Commercial phenothiazine-salt mixtures of these proportions are available.

Some sheep raisers prefer to give the drug in a mixed mineral

supplement. Either mixture should be placed in a container where it is sheltered from the sun and weather, and where sheep have ready access to it. Containers should be located near the common water supply and preferably near any source of supplementary feeding. Enough of the mixture is put into the container to meet the salt requirements of the flock for two to four weeks.

Usually 30 sheep will consume in a month 10 pounds of medicated salt, containing one pound of phenothiazine. Less phenothiazine would not provide adequate protection against infestation with roundworms. At current retail prices of about 75 cents a pound for the phenothiazine powder, it would cost about 75 cents a month to maintain 30 sheep under this treatment.

Good But Not Perfect

The preventative treatment with phenothiazine-salt mixture is widely used in this country with remarkable success. It is simple, easy and effective. However, it does not provide the full solution to the problem.

No anthelmintic treatment for worm parasites should ever be expected to be a substitute for good management. Sound practices of breeding, feeding, and management must form for the basis for prevention of losses from disease and parasites. Treatment is merely a helpful addition.

The success of the use of treated salt on a free-choice basis as a preventative depends upon the natural desire of sheep for salt. Therefore, the treated mixture must be the only source of salt available to the flock. In areas of high soil or water salinity, or where natural salt is exposed, the treatment is not practical because it must be assumed that sheep would consume salt from natural sources and not get enough phenothiazine to protect them from parasites.

Winter Treatment

Another reliable system of preventative medication is the winter treatment of sheep with phenothiazine. It is used principally in northern climates and is based on individual dosing of breeder ewes in the winter between grazing seasons.

Most parasites do not survive a winter on idle pastures. They are perpetuated in breeder stock during the winter months and contaminate spring pastures in time to strike at young spring lambs. To combat this cycle, the winter treatment calls for a therapeutic dose of phenothiazine (25 to 30 grams, usually about one ounce per animal) immediately before the sheep are put

onto pasture in the spring.

This program can be used only in areas with cold winter climate, while the free-choice method with treated salt can be used in any area that does not provide natural salt. Less of the drug is used in the winter treatment method, but more labor than in the phenothiazine-salt method.

Recommended individual dosage is about one ounce of phenothiazine for sheep and a little over half an ounce for lambs. It may be given in feed, in a drench, or in capsule. In drenching, two ounces of liquid containing about 40 to 50 per cent phenothiazine is the usual dose for mature sheep. Several animals can be treated at the same time by mixing the drug with feed, making sure the medicated feed is consumed in a short period of time, usually within a day.

Goats respond about as well as sheep to therapeutic medication with phenothiazine, although slightly larger doses (35 to 40 grams for adults and 15 to 20 grams for kids) are generally indicated for large animals with heavy infestation of intestinal hairworms. As with sheep, the drug may be given in capsules, in feed, or in a drench.

In dairy goats the milk from treated animals turns pink for three to four days following medication and should not be used for human consumption during this period.

It is not harmful in any way, however, and may be fed freely to other animals. Rarely, young goats may be temporarily blinded if they are exposed to bright sunlight on the days after dosing while the drug is still in the system. (The same effect has been reported in swine and cattle.)

The continuous free-choice use of phenothiazine and salt mixtures, as described for sheep, has not been reliable for the control of gastro-intestinal parasites of goats. However, a slightly modified procedure has shown promise of effective action.

The USDA is continuing its investigations to find more effective preventive treatments.

Cattle have been used in a number of experiments to develop a practical method of providing phenothiazine on a free-choice basis. Some preliminary trials have been successful. Others have not.

Results of these investigations indicate that no specific program will apply generally to all herds.

However, the most consistently effective results by this method have been achieved by mixing the chemical with feed, providing about ½ gram of phenothiazine for every 100 pounds of body weight up to a total of two to five grams per head daily for

cattle over 500 pounds.

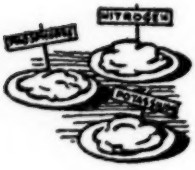
In therapeutic treatment for the removal of stomach worms, intestinal hairworms, and nodular worms, phenothiazine is very effective in doses of 10 to 20 grams per 100 pounds of live weight, with a maximum dose of 60 grams, administered in feed, in capsules, or as a drench.

The perfect anthelmintic has been described as one that would have no injurious action whatsoever on the host and yet would kill all or practically all the parasites infecting an animal. No such drug has yet been discovered. However, phenothiazine appears to be the nearest approach to that now available.

Phenothiazine As An Anthelmintic

Species	Parasites Controlled	Preventative Treatment	Therapeutic Dose
Sheep	Hairworms, hookworms, nodular worms, stomach worms, wireworms.	Continuous exposure to 1 part phenothiazine mixed with 9 parts salt on free-choice basis during summer grazing season.	1 ounce for sheep, ½ ounce for lambs.
Cattle	Stomach worms, hairworms, nodular worms.	None fully developed. Good results from daily doses of ½ gram phenothiazine per 100 lbs live weight up to 2 to 5 grams daily per animal. In some areas the treatment recommended for sheep has given good results.	10 to 20 grams per 100 lbs. live weight. Maximum dose 60 grams.
Swine	Nodular worms.	None recommended.	12 grams phenothiazine per 100 lbs. live weight, by dose syringe, stomach tube, or capsule.
Goats	Stomach worms, hairworms, nodular worms.	None fully developed. Some good results from "weekly salting" with 1 part phenothiazine and 7 parts salt, and with continuous free-choice administration of 1 part phenothiazine and 10 parts salt.	35 to 40 grams for adults; 15 to 20 grams for kids.
Horses	Strongyles.	None fully developed. Good control from 2 grams phenothiazine daily for the first 21 days each month throughout grazing season.	30 grams

Now, Fertilize to Match Moisture



Nitrogen likes it moist. Phosphorus likes it dry. Let the weather help you profit more from fertilizer . . .

Condensed from Farm Journal

Sterling A. Taylor and *Jay L. Haddock*
Utah Agricultural Experiment Station

FOR years, we've suspected that whether a soil is wet or dry has a lot to do with how crops use plant foods in the soil.

Now we have figures to show how true that is—figures gathered during five years of experiments by the 11 western states, under the leadership of Utah State Agricultural College and the USDA's Agricultural Research Service.

We find that plants have more trouble getting enough nitrogen in a moist soil than they do in a dry soil. So when moisture is *plentiful,* crops make good use of *extra nitrogen.*

With phosphorus, the opposite is true. Plants have more trouble getting phosphorus in a dry soil. When moisture is *short,* extra *phosphorus* gives the greatest kick.

How important is this? Well, let's look at the phosphorus figures. In these experiments, $10 worth of phosphorus made an extra $60 worth of sugar beets in a dry soil; only $14 more in a wet soil.

When we put on 220 pounds of 0-45-0 per acre, and let the soil dry out between irrigations, the beets averaged 16.1 tons per acre for five years running.

Beets alongside, irrigated the same but given no phosphorus, averaged only 12.2 tons. So the $10 worth of phosphorus made an extra 3.9 tons of beets, worth almost $60.

On the other hand, when we didn't let the soil dry out between irrigations—watered often enough so that the plants never showed signs of wilting—the no-phosphorus beets did almost as well as the others. They made 18.5 tons, as compared with 19.4 tons for the phosphated beets, right alongside, that were watered exactly the same.

Our $10 worth of phosphorus

Reprinted by permission from Farm Journal, Philadelphia, Pa.

still showed a small profit, though —made almost an extra ton of beets, worth about $14. But it didn't pay off as well as it did on the dry soil.

This means that if you're an irrigation farmer, and are able to keep your soil at about the right moisture level, you can get along on less phosphate fertilizer. Of course, it's still a good idea to replenish phosphorus as you go, instead of mining the native supply in the soil.

If you aren't irrigating, we believe this proves that it pays to keep extra phosphorus in the soil. Otherwise, crops may run short during summer dry spells. If it turns out that the crop doesn't need it, you aren't out anything, because the phosphorus will carry over for the next crop.

Our nitrogen results aren't quite as striking as the phosphorus figures. That's because in our experiments the beets were grown in a five-year rotation that included two years of alfalfa. The alfalfa added considerable nitrogen, and the beets used it. But the figures do prove that plants have trouble getting enough nitrogen in moist soil.

For example, when we put on 80 pounds of actual nitrogen—about $12 worth — and 220 pounds of 0-45-0 per acre, then kept the soil desirably moist, the beets averaged 21.1 tons per acre. That's 1.7 tons more than phosphorus alone, as we mentioned earlier. The $12 worth of nitrogen made about $25 worth of beets.

So skimping on nitrogen doesn't pay if you have plenty of water. This also proves that non-irrigation farmers will be money ahead in a wet year if they side-dress with more than their usual amount of nitrogen.

How often we watered, and how much we put on, proved to be just as important as how we fertilized.

For example, unfertilized beets that got four irrigations totaling 19 inches of water during the season, averaged only 12.2 tons per acre for the five years.

But unfertilized beets that got 12 waterings totaling 22 inches averaged 18 tons. The lighter, more frequent "drinks" made an extra six tons of beets. Suppose that water is scarce—what then? Well, less frequent irrigations will be most efficient. Here's why we say that:

Beets that got both nitrogen and phosphorus and 12 irrigations—22 inches in all—averaged 20.2 tons five years running. It only boosted yields to 21.1 tons when we put on 26 inches with 30 irrigations. That extra four inches of water may well have paid off better on another crop.

If labor is scarce and expensive, you may want to figure an-

other way. Fertilized beets that got six irrigations—22 inches in all—averaged 18.4 tons. For some farmers the extra ton of beets that they'd get with 12 irrigations wouldn't pay for the added work.

With shallow-rooted crops, you need to keep the top 12" to 18" of soil continually moist to get top yields. Our experiments proved this with potatoes and canning peas, as well as with beets.

Not so with deep-rooted crops, however. As long as there's moisture and plant food down deep, they don't suffer much when the surface dries out.

So the trick is to match up all three: moisture, fertilizer, and crop. And that takes some doing.

Detergents May Solve Bloat Problem

Common household detergents may be the key to bloat control, but first they'll have to be made to taste better.

That's the conclusion of R. E. Nichols, veterinary scientist at the University of Wisconsin, after a survey of some 40 farmers over the state who tried detergent compounds on about 1400 cows last year.

The compounds called alkyl aryl sulfonates—the basic material in many household detergents—seemed to control bloat in most cases. But many farmers reported difficulty in getting the cows to eat the material.

The compound was either sprinkled on top of the cow's daily feed, or mixed in salt blocks. When placed in salt blocks, many cows didn't eat enough salt to get enough of the compound.

Nichols thinks the problem right now is making it easier to get cows to eat the powder. He is going to try mixing it with molasses, saccharine, and licorice to mask the bitter taste.

In the field tests, nine of the 40 farmers were enthusiastic about the good results. A larger group, 15 farmers, gave qualified approval—holding back mostly because of difficulty in getting cows to eat the material. Only three or four farmers seemed displeased, and their complaints were based on the cow's dislike of the detergent compounds.

Wisconsin Extension

Research results show that the winter season is the ideal time for using chemical treatment for controlling undesirable hardwoods. Either 2,4,5-T or ammate, both non-poisonous to man or livestock, are the recommended chemicals. Local county agents have detailed information on their use.

FINANCING THE FARM BUSINESS

The job of financing present-day farm operations under high cash costs is not a simple one . . .

Reprinted from Journal of Farm Managers and Appraisers

F. W. Peck, Farm Foundation

THIS farming business is highly competitive. As in every productive effort efficiency receives the rewards. Low cost per unit of output and increasing output per man become the objectives of commercial farm production.

Over a third of a century ago, when the Congress initiated the beginning of the cooperative farm credit system, it was apparently believed that the existing credit machinery could not adequately serve the needs of a widely diversified changing agriculture. Among the important considerations more or less peculiar to the farm business then recognized are:

1. Financial returns from farming generally are low in relation to invested capital.

2. These returns are subject to wide fluctuations.

3. Farms ordinarily cannot be paid for in 5 years, nor 10 years; in fact it is doubtful if many commercial farms can be paid for in less than 30 years—at least under conditions that existed prior to 1941. Many farms have not been paid for within the active operating lifetime of a farmer.

4. In the short term credit field there are few uses for 60 and 90 day credit, but ordinarily the need runs from 6 to 9 months, and even up to 7 years.

5. Agriculture is so diversified and so responsive to economic and physical changes as to require a dependable source of credit in bad times as well as in good times. Farmers cannot readily switch investments to fit prospective returns as can city people.

There are now ample funds available thru numerous sources

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of credit, hence this does not represent a problem unless the acutely distressed dry areas may require government financing of one sort or another if the drought continues. This means that competition for loans is keen.

However, it may be assumed that a debt of any appreciable size represents a problem to the individual debtor. The total long-time farm mortgage debt presently exceeds over eight billion dollars while the short term debt is also in that general neighborhood. This represents what some people fear may prove to be a burdensome load if farm income continues to decline and cash costs of farming continue slowly to rise or even stay where they are.

There is one significant development in the farm mortgage loans that is worth noting. There is a continuing volume of mortgage credit being used by farmers for purposes other than buying real estate. For example, in the second quarter of 1954 the following breakdown as to loan purposes, submitted by 13 life insurance companies, was as follows:

1. Purchase of real estate, 31%.
2. Refinancing of real estate mortagages and sales contracts, 35%.
3. Refinancing other debts, 17 %.
4. Repair and improvements to land and buildings, 8%.
5. Miscellaneous purposes 9%.

This is in line with the decrease in farm sales of the past year as compared with former years. What about land prices? If not too high, looking backward, how do they look as you peer into the future? I note a report by a lending agency in the better areas in Illinois indicating loans of $175 and over per acre. To a country boy from Minnesota this looks high. On the other hand, if one capitalizes 125 bushels of corn per acre at a dollar at any reasonable rate a valuable farm property is indicated.

Simply to indicate the types of principal lenders and the proportions they hold of loans presently financing agriculture it may be noted that in the long-term land mortgage field insurance companies hold 25%, commercial banks 16%, federal land banks 16½%, Farmers Home Administration about 4% and individual miscellaneous lenders about 38%. Of the short-term loans the commercial banks made 43%, merchants and dealers 46%, the production credit associations 7% and the Farmers Home Administration about 4%.

The job of properly financing present-day farm operations under high cash costs is not a simple one. There are those who fear that credit agencies generally have not done as good a job as

might be done in gearing various types of needed term loans to the purposes for which credit is required.

For example, the alleged need for a new type of intermediate term loan is being widely discussed and definitely recommended for extraordinary farm practices and adjustments such as heavy expenses for soil conservation, for heavy fertilizer applications, for adjusting cash crop lands to grass, for pasture improvement, for livestock purchases and for farm and home improvements. Most of these purposes call for terms of credit beyond the customary one year, even with privileges of renewal for up to three years. Many of these purposes can be better served with a ten-year land mortgage loan if the farm is not presently encumbered to its reasonable debt limit. The basis for considering loans of this intermediate type would require an annual financial statement of the farm business each year and will likewise call for close association between the borrower and the lender. Such loans might well bear a higher rate of interest if they required extraordinary types of servicing. Many farmers are more interested in the terms of repayment than in the interest rate.

There is a comparatively new but growing type of short-term loan ordinarily called the budget, or barnyard loan which usually is made for general production purposes. In this loan the farmer makes arrangements with a credit agency at the beginning of the year for his credit needs for the entire production year. Advance commitments are made by the bank which assure the borrower that funds in specific amounts will be available as needed. Borrowers are thus assured of a supply of credit in advance and pay interest only on the outstanding balance. Repayments are made as the crops and livestock are marketed. This would appear to give the lender an opportunity to review and analyze the loan as advances are made, while the borrowers would be operating on a prepared and well thought out budget. This type of credit will likely tend to increase.

Getting Started in Farming

There is a great deal being said and written today about the difficulty of young men getting started in the farming business. If one is impressed with some of the prophets of gloom that are predicting heavy falling prices of farm products and a decline in income he might ask why any intelligent young man wants to enter the farming business. Not being one of these prophets of gloom, I am an optimist, from the long-time point of view, for the future of intelligent farming on good land.

I can well understand young men who have been raised on good farms desiring to make careers of this business.

The capital requirements are high, not only for the purchase of land but for the purchase of sufficient equipment for young men to start as tenants. In a recent study of 317 beginning farmers in Minnesota, over 80 per cent started as tenants and over 50 per cent of these started with less than $3,000 of net worth. Over a third of the total number, however, rented farms from relatives and had the use of some of the needed equipment for the first three years. Of the 317 young farmers, 246 were veterans and received G.I. agricultural training with the accompanying financial benefits. Two-thirds of the capital came from savings from working farms and from savings and contributions from their wives.

The initial capital that is difficult to obtain to get a start in farming and the large cash expenses required under present-day farming conditions bring many credit problems. In a group of 157 cooperators in a farm management service group in southern Minnesota for the 1948-52 period, cash operating expenses took 56 cents of each dollar of income. Depreciation of buildings and machinery absorbed 9 per cent and taxes 4 per cent. These items total 69 per cent of the income, leaving 31 per cent to pay for family living, debt service, life insurance, new capital investments and miscellaneous items that always exceed one's expectations. It may be recalled that these five years represented a more prosperous period than may be expected for the next several years.

This same group of cooperating farmers were asked a series of questions as to their recommendations to young men desiring to go into the farming business. The following represents the advice of this group:

1. Amount of capital: The average amount of capital needed by a tenant to operate their farms was placed at about $9,400.
2. Equity needed: They said the starting farmer should own at least one-half of his working capital at the start.
3. Buying a farm: Young men purchasing farms should have their personal property clear and be able to pay down at least one-third of the purchase price.
4. Start as a renter: Nine out of ten of these established farmers strongly favored starting as a renter.
5. Avoid heavy machinery investment: A starting farmer with limited capital was advised to avoid excessive investment in machinery and equipment.

Buying good used machinery, hiring custom work and exchanging labor for machine work were suggested as alternatives to buying expensive pieces of equipment.

6. Prefer quick return investments: They suggest giving preference in investments that give quick returns such as dairy cows, hogs and chickens.

7. Get a good farm: Make every effort whether buying or renting, to get on a good farm of adequate size. These experienced farmers do not give any encouragement to buying a run down farm and trying to build it up.

8. Assistance from relatives helps: Financial assistance from relatives in the form of gifts, loans at rates and in amounts more favorable than commercial lenders can offer and the loan of some machinery are valuable aids to the beginning farmer.

9. Capital may not be the major problem: These experienced farmers emphasize that such personal factors as know-how and frugality may be more important than the amount of capital. They also mention the desirability of having a wife who is also well endowed with these same personal qualities.

Better Cows Offset Dairy Product Prices

Best way to offset lower dairy prices is to have better, not more, cows, according to G. A. Williams, extension dairyman at Purdue University.

Using information from one dairy herd improvement association when the record of the lowest producers was dropped from the yearly records of each of 25 herds on test, production increased 785 pounds of milk per cow. When the two lowest producers were omitted, production increased 1663 pounds of milk per cow and the average of the association would have been increased 2699 pounds per cow if every dairyman had disposed of the three lowest producers at the start of the year.

Low producers are the least efficient, hence, the most expensive producers in the herd. Many cows lack the inherited ability to convert feeds into milk efficiently. They fail to make any profit for their owners, yet, they produce milk and butterfat which must be processed and marketed. Such production may, at certain seasons of the year, tend to create temporary over-production and reduce the general price level. Cows producing less than 6,000 to 7,000 pounds of milk are not likely to be money-makers today, says Williams.

Purdue University

Why Should You Lime?

There are many good reasons why farmers who have acid soils should use lime. Perhaps the best is that it pays handsomely. Data obtained from many field experiments show that for every dollar a farmer invests in the use of lime on acid soil he gets a return in the course of several years of five to ten dollars in the form of increased crop yields and better quality of products," says Emil Truog, University of Wisconsin.

"Here are reasons why farmers should lime their soils:

1. The first and most important step in making distinctly acid soils suitable for the growing of alfalfa is to bring their reaction within the range of pH 6.5 to 7.0. When well drained land in Wisconsin is properly limed and fertilized, alfalfa becomes a sure-fire crop, and produces three to four tons of forage that has no equal as feed for livestock.

2. It has now been definitely proven that when acid soils are limed to pH 6.5 to 7.0 the phosphorus in them is made much more available for crop use. Also, any phosphorus added in phosphate fertilizer is kept more available. Liming also favors the availability of the nitrogen present.

3. All plants need calcium and magnesium for growth and seed production. In acid soils, the amounts of these elements present in available forms is sometimes not sufficient for good plant growth. Dolomitic lime supplies both calcium and magnesium in available form.

4. There are both good and bad kinds of soil bacteria. Liming of acid soils favors the good kind so that they crowd out or replace the bad.

5. When soils become strongly acid, concentrations of soluble aluminum, manganese, and iron and even of acids themselves, may become so great as to be toxic to plants. Liming corrects this condition.

6. The addition of lime to acid soils causes an improvement in their physical condition by promoting a granular structure of the soils.

7. The vigor of many plants is favored by the liming of acid soils. This increased vigor lessens the possible damage from insects and plant diseases. An ample supply of available calcium promotes root growth, and thus, greater resistance to drought.

Wisconsin Extension

Speculation or Gambling

Second part of an interesting, comprehensive article about trading in grain and cotton futures. Written by a man who has made a personal hobby of studying the commodity exchanges . . .

Morris Braun

If the farmer and dealer were price insured, and the members could not support each other, the only other element in the contract market is the amateur speculator. After all, the members properly argued, is it wrong to have an active market to support the farmer's hedging?

Is that what the farmer thought? Let's visit with the Freys and see. Sam Frey and Will Parlem had passed on, but not before they had been granted the pleasure of dancing at the wedding of young Lily Parlem to Sam's eldest son. Amos now owned both farms, most of it planted to wheat. And doing a good job for their brood of six future 4-H founders. Until the depression of 1887, when the price of wheat sunk to 65c below his cost of planting. On a bitter night in February, he and Henry rode to town and attended a meeting of their neighbors to discuss the problem.

Chet Hooker suggested that the men sell their crops as soon as planted; that that would be price insurance against the sort of price loss facing them. Amos said, "My father also liked the idea until he was burnt a few times, when he found that if he had to deliver the cash wheat, he did not get the price he had agreed to."

"Why not?" Chet asked.

"Well, when part of the crop was killed during the winter, Dad replanted with Spring wheat, and harvested the Spring and Winter wheat together. When he offered delivery of the mixed wheat, the buyer insisted he would pay less because he had contracted for No. 1 Hard Red Winter. When Dad complained about this, he was told that those were the provisions in the contract he had sold. Although he was under the impression that he had contracted to sell the wheat he had grown on his land."

Henry Lambert laughed. "What else could there be, Amos? After all, there must be a stand-

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ard form of contract. But what else happened?"

"Most of the time, Dad didn't do too badly. But a few times after he had sold his future crop, the price of the paper contract went up and the price of his cash grain went down. He had to buy back his contract and sell his cash crop, and lost money in both directions. He told me that if that was insurance, it was too hard for him to understand. I suggested . . ." Henry Lambert interrupted.

"What Sam and you did not know, Amos, was that you were dealing in two different kinds of markets until the future wheat became cash wheat. If you did not have enough margin up, you could lose very easily in the futures market, as Henry did, too. But if you study the movement of both markets and only hedge with your crop when they are moving together, you are usually safe. And they move together most of the time because every future contract finally becomes cash wheat. It's insurance to me."

Dave Philpott, the acting secretary salted the minutes. "Much confusion," he wrote, "but could learn nothing."

The price of wheat drove the voting farmers to a fury. The Hatch Act was passed and not passed. If that sounds confusing, it is.

After long hearings by the 52nd Congress (1891-92), the House by a vote of 167 to 46, passed the Hatch Act, designed to place a heavy tax upon all futures contracts, if there was no delivery. It was amended and passed by the Senate by a vote of 40 to 29. As reported out of the Senate, it was necessary for the House to approve the amended bill. Congress was to adjourn in three days, and to bring it to a vote again, it was necessary for the House to suspend its rules, requiring a two-thirds vote. This was not obtained, although the vote to suspend the rules was 172 to 124. The amended bill was not voted upon by the House. In the following Congress, the amended bill was reintroduced. It was not passed. Wheat sunk to 49c.

The students of price movements maintain that a cool study proves the value of the futures market. Dr. H. C. Emery, with a lifetime of study behind him, before the meeting of the American Society in February, 1900, said, "We have then in the case of the speculative market a method of shifting risks unlike anything else in the business world, and we have a special class whose distinct function is to assume those risks."

The courts probed and in 1903, Judge Dorrance Dibell of Illinois said, "No one can be found

to deny that parties can gamble on differences, under the rules, as easily as legitimate business."

The publicity given these operations, the unhappy situation of the farmers, the losing speculators led the attack on all fronts. Justice Holmes in the Supreme Court at Washington gave his official opinion; that speculation was part of business and that all legitimate business was entitled to the protection of our laws.

Congress carried the attack forward. In the 60th Congress (1907-09), 25 bills were introduced all of which were intended to prohibit futures contract trading; in the 61st Congress, 17 were introduced and in the 62nd, 42. Long hearings were held, but none of the bills became law.

The struggle whipped back and forth. On March 28th, 1910, W. B. Thompson, President of the New Orleans Cotton Exchange, said, ". . . It is an instinct of nature that cannot be eliminated. Laws forbidding speculation would be as ineffectual as would be the statutes for the limitation of the tidal movement, or for the repeal of the law of gravitation."

On March 3rd, 1944, Representative Manahan of Minnesota, before the Rules Committee of the House, said, ". . . I make the deliberate statement to the committee that the price of wheat in Chicago and Minneapolis is not made by the so-called world supply and demand. Nor is it made by the so-called cash wheat arriving at those markets. It is made by the operators in future options . . .".

Everybody was agreed though, that the farmer was entitled to a profit and the consumer to pay a reasonable price. Dr. Emery, talking before the Pan-American Congress in 1917 said, "It is not merely the futures market in its direct effect that we need to consider, but the futures markets as the flywheel on the whole wonderful mechanism of trade and credit by which agricultural products are carried across the world from the producer to the consumer with a promptness and cheapness truly marvelous. There may be other arguments of a different nature against this method of trading. So far as the question of efficient marketing of farm products is concerned, which is the subject of this conference, the case is proved."

A good many heads of college economic and agricultural departments of the time, agreed with Dr. Emery. Wheat went to $3.25 a bushel, under emergency war laws. And couldn't be gotten, at that.

As wheat rose to $3.50 and then slid to $1.40 in the Fall of 1920, Congress again took a hand and delivered the Capper-Tincher Bill, putting a tax of 20c a

bushel on all future contracts traded, without delivery. Unconstitutional, said the Supreme Court, and out it went.

Cousin Paul Frey attended Senator Norris's hearing in 1926, and chuckled at Dr. Duvel's common sense observations. Turning to another farm delegate from Alabama, he said, "True enough, but what product does Dr. Duvel mean, cash wheat or paper contracts?"

Both were selling for $1.85 a bushel; profit was guaranteed and they were moving together. The farmers were only half mad. The consumers could afford the price of bread.

From July, 1929 to November, 1931, cash and future wheat skidded down price row from $1.63 to 49c a bushel. Bread was cheap too, but getting it was hard. Rumblings were heard in the land. The Farm bloc went into high gear.

On February 2, 1931, the Committee on Agriculture and Forestry met again. This time the Senate had resolved that futures are a matter of national public interest; that unless they were watched they could be manipulated! and that manipulation would be a crime. The text for the meeting was Department of Agriculture Bulletin No. 199. "For a market to be attractive to speculators, large and frequent price changes must occur. This is an observation familiar to all interests actively following the market . . . When price changes are larger, speculative activity is also large; when prices move within narrow limits, interest wanes and trading declines. The reason for this direct relationship is also well known. Large price movements afford ample opportunity to buy and sell or sell and later buy at a profit. Without price swings of substantial size, this opportunity would not be present."

Senator Caraway of Arkansas questioned Edward A. O'Neal, then Vice President and to become President of the American Farm Bureau Federation.

"In other words," said the Senator, "you cannot stabilize so long as some gambler runs the prices up and down."

Mr. O'Neal summed up his views.

"Much of these operations have little relationship to actual marketing of grain or to actual supply and demand, but the price changes resulting from many of these operations frequently represent the interplay of speculative struggle—a struggle between the bull gamblers and bear gamblers, with the farmer being the goat in most instances."

Department of Agriculture Circular No. 201 tried to make the situation clear. "It has long been recognized that futures and

cash-grain markets are definitely related, but just how and why they are related has not been equally understood. Cash and future prices during certain periods will be found to move in close accord, but in other periods wide variations develop and without apparent cause." Continuing, "While hedging provides a means of protection against possible losses, it is by no means a complete guarantee of profit."

The Farm bloc rolled. October 17th, 1933 gave birth to the Commodity Credit Corporation. The farmer could now apply for a loan under the Agricultural Adjustment Act, permitting him to get the same purchasing value for his grain as he did in the time from 1910 to 1914.

This parity price was established and changed monthly, based on a percentage of prices paid by the farmer for his family needs, production needs, interest on his mortgage and taxes on his real estate. After the loan is made, if prices on his crop drop, the farmer can let the government take the crop; the government must accept it in payment. A third market had been created with the government as buyer and changing laws to meet modern conditions.

In full swing, the cash market, the futures market and the C.C.C. paved the way for the Commodity Exchange Authority in 1936. The Commodity Exchange Act regulates the futures market; all commission brokers must be licensed; closer supervision was had.

At the American Economic Association in December, 1940, T. W. Schultz urged the use of forward prices. He recommended that the loans of the Commodity Credit Corporation be based, not on parity, but on crop and marketing costs, and dependent on what the consumption figured to be. Also, he suggested, that the loan rates be set in time for the farmers to make plans for the new crop. This, he later added, would create a "gigantic futures market which will push ahead a list of prices, to guide and direct production of farmers."

Wheat in government storage during World War II and price ceilings stopped a repeat performance of World War I, when wheat ran away with itself. Futures ranged to $1.85, with the government loan rates as a price floor.

A condition now exists where the trading of contracts is only dependent on the "free" supply; that is, the grain not in government storage. The futures contract always calling for delivery of the cash grain in the free supply, the contract price must move up or down as the cash price does. Or, does it?

That is usually so, but as with

all rules, it carries its own exceptions. And sad is the farmer with a free supply who does not keep an eye on the situation.

What percentage of the traders in futures is hedging and what is speculation, nobody has ever found out. Investigators have been told that the customer is not asked what class he is in; to do so would violate the customer's and broker's right to business privacy; and they are right. But how the market operates is not difficult to analyze, as the Department of Agriculture has done several times.

Both cash and contracts must move as the free supply changes, the demand being more or less the same. As in all markets, the smaller speculator tries to guess the movement of the successful operator, as who can blame him? The successful men, blessed with ample capital and large know-how, are sure of themselves and of the long range price effects, based on the free supply and the seasonal comings-to-market; luck, weather and the world price being but small factors in their operations. Most of their investments are profitable; if they weren't, they would lose their professional standing.

The amateur, trying to reach this position, but limited in capital and experience, is more dependent on the smiles and frowns of Lady Luck; in and out of the market fast, he contributes himself heavily to the very movements that swallow up his capital. Weather, competition, world price and unknown conditions take their bite as well.

The normal and well-understood condition is for the futures contract to be more than the cash grain by storage costs, because if you own the cash you would have to pay storage charges. But if the free supply is so great that all available space is filled, the spread may widen by more than the storage charges. Or, if the grain coming to market has a high moisture content so that it cannot be safely stored, the risk will widen the cash-future spread; at times, the reason for the spread is unknown. The other risk to the hedger of course, is the different price he must take if the grain tendered is not of contract grade.

In fact, very few futures are fulfilled by delivery, on the average, less than 1%. But as long as the right to deliver exists that tends to keep future prices moving together with the course of cash prices. And in the delivery month, the futures contract and the deliverable grades are practically the same. So it follows that neither price can get very far out of line with each other. Is that so?

It is established that futures prices are determined by cash

prices in the delivery month. But are cash prices ever determined by future prices? Why, of course; first when future prices are more than a carrying charge above cash prices and s e c o n d, during squeezes. But most important of all, futures set the cash prices at all times, because the highly publicized stream of futures bids and offers are too much for the cash dealer in grain to ignore. Instead, the dealers follow closely the course of future prices and base their bids upon them. To do otherwise, would be business suicide for the dealer.

Does speculation s t a b i l i z e prices? It seems that futures trading neither deserves the blame heaped upon it for causing large fluctuations, nor praise for its stabilizing force. Actually, it appears to have very little long range effect one way or the other. Hedging provides only partial protection against price changes; the stabilization program of the Commodity Credit Corporation is designed to reduce these too-rapid changes.

On manipulation through inside information, the New York Times of December 14th, 1954, editorialed:

"—The C.E.A. and Crop Reporting Board are both subsidiary agencies of the Department of Agriculture. In such a situation, the Government itself is responsible for the accuracy of the crop forecasts, and unless there should be a 'leak' in the crop figures (something which has never occurred in the long and creditable history of the crop reporting agency) it would be difficult to prove that the market was being manipulated by persons who were privy to information not available to the public."

Let's see if we can get an opinion from sources with no interest in the argument:

Webster's Dictionary defines "Wager—that which is risked on an uncertain event; a bet. A wager may have the form of a c o n t r a c t, called wagering or gambling contract. Contracts of this nature include various forms of valid commercial contracts as contracts of insurance, contracts dealing in futures, options, etc."

Funk & Wagnall's Dictionary defines "Gamble — to play a game, especially a game of chance for stakes, to make money or other possession on any event, chance or contingency; to pretend to buy or sell, depending upon chance variations in price for gains as to gamble for drinks, to gamble for wheat."

Is it speculation? Gambling? Or, is it insurance?

Insects ate or damaged nearly $119½ million worth of food during 1954 in Michigan, M.S.C. entomologists figure.

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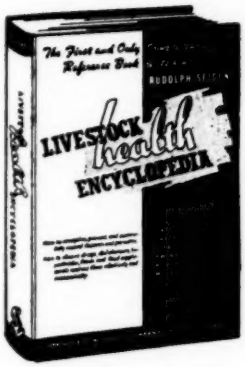

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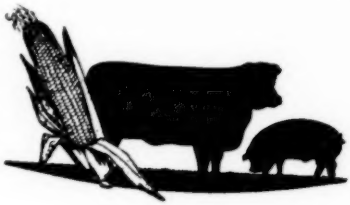
TIME . . . and Farm Prices



If you try hard to understand and take advantage of fluctuations in livestock prices, here's some new information for you.

It's been about 50 years since pork chops sold over the counter for 11 cents a pound, and beefsteak for two pounds for a quarter. Since that time, meat prices have increased almost seven-fold, nearly twice the increase of most other consumer goods over the same period.

A recent study of the demand for meat by consumers, conducted jointly by the University of Illinois and the University of Chicago, delved into the reason for changes in demand, and came up with some interesting answers.

The fact that the value of the dollar is about half what it was in the 1890's is, of course, one reason that meat prices have advanced. But the report also points out that as the nation's standard of living increased, people have turned from cheaper foods, and have spent more for meat.

Also included in the report were some interesting consumer reactions to varying meat supplies. For example, they found that when the supply is decreased from one year to the next, consumers willingly pay more total dollars for the smaller supply. But when the supply is kept low for several years, they gradually cut the amount they spend for meat to about the same as they spent for the larger supply.

Similarly, the report says that when the supply of meat is increased from one year to the next, retail prices must be reduced more than the supply is increased. But if the larger supply is maintained for several years, consumers gradually increase their spending for meat until they spend about as much as before.

All these things have a rather profound effect on farmers' incomes. That they can make a quick profit from a sudden reduction in meat supplies, but lose this advantage in later years is undoubtedly reflected in their spending. The converse is also true . . . that farm profits suffer from a sudden increase in production, but consumer demand gradually builds up to take the larger supplies at prices that can return profits to farmers.

—From Feed Age